

Children Design

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ABSTRAKT

Diplomová práca je niekoľko mesačný proces tvorby detskej jedálenskej stoličky. Výsledkom autorkinho záujmu o design pre deti, je poznanie krehkej hranice medzi jednotlivými zložkami funkčnosti, estetiky, ergonómie a samotného nadšenia z vývoja a experimentovania.

Kľúčové slová: design pre deti, nábytok, dieťa, batola, kŕmenie, ergonómia, detská jedálenská stolička,

ABSTRACT

The diploma thesis is a several month-long process of children's high chairs. The result of the author's interest in children design is knowledge of the fragile boundaries between the different segments of functionality, aesthetics, ergonomics and enthusiasm of development and experimentation.

Keywords: children design, furniture, child, toddler, feeding, ergonomics, high chair

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I want to say thanks to my friends who help me many times and they are still nearby me. And finally, the biggest THANK YOU pertains to my lovely parents - to my Mum and Dad whom they are my main support and patient.

Acknowledgements, motto and a declaration of honour saying that the print version of the Master's thesis and the electronic version of the thesis deposited in the IS/STAG system are identical, worded as follows:

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Manifesto

So you get an idea.

A stupid idea but you like it.

So you look at it till you don't like it. So then you make another model as another way of looking at the first stupid idea, and you like it but only for a little while. So then you hate some of it, so you make another model to fix it but it looks different but you like it so you look at it until you start to not like it then. You try to fix and a new idea comes out which you like better and then you don't like it so much but still a little. So guess what you do?

Yes you make another model. *So this goes on and*

on and on till you so many models, it costs a fortune to store them. But you go anyway. More and more till voila the piece de resistance. It's glorious, it's cheap and it looks different. So nobody likes it.

You'd cry, you'd nearly die. *Then the lord sees*

*a messenger. He hypnotizes all the people so they all like the idea. They want to steal the idea; they want to steal the models. They want a piece of your mind and soul. **But you're strong and don't give it.....***

Frank Gehry

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INTRODUCTION

The childhood memories.

What kind of time does it mean to you?

Was it a time when you had to attend school every morning, go to bed really early and everything was too big and too high?

Or was it a time when you looked forward to having each holidays (even this one which lasted only a day), enjoyed time when you could stay outside even 10 minutes longer or when you were impatient to be Christmas and you could hardly wait for a small Jesus?

These moments are priceless for me. I am smiling myself because the most sensational fact is, these experiences have been locked inside and none has ever had same ones.

Stunning, isn't it?

The period of life which each of us survived a plenty of that none of us have not able to save in our small heads. A lot of memories, a dozen of summers which we have spent with our grandparents in the villages.

Actually, memories remind me all amazing summer holidays with my grandmothers, cousins and places over there. Plenty of mushroom picking, hundreds of "hide and seek" which we played, animals in my grandma's backyard and a secret agreement of eating sweets because my mom didn't have to know it.

Incredibly tasty potato pancakes, juicy strawberries and cherries which we picked from the trees (sometimes in neighborhood's tree gardens, and of course it was our top secret mission invisible), buying bread in the smallest shop ever, colourful tomcat called "Ušo" and a cup of cacao for breakfast every morning.

Beautiful remembrances. I have been writing more few words and I am smiling again. Smelling of flowers in the garden and hay in the fields. Summer warm rain in my hair because I believed I could grow up taller, Grandma's garden full of tulips and daffodils because Vinca used to love gardening. And so I.

And fluffy yellow chicks in the spring time. And I remember a couple of baby goats which she used to have in the stable...

Thank you! To my grandmothers Vinca and Verona. Thank you for an incredible childhood!

THEORY

1 ANALYSIS FOCUSES ON CHILD DEVELOPMENT

The beginning of the theoretical part has been dealing with the child development from a birth to the adulthood; it focused on the period from newborns till preschooler particularly. It incorporates a process included physical, physical and intellectual aspects and important influences in the childhood.

Anthropometry which is quite a young science has a growing impact into several sphere, but an inseparable relationship between human and objects, whether of user perspective or designer side.

An overview of the several ways of feeding babies and some comparison is another part of the chapter. History of breast feeding, impact of the Industrial Revolution or lack of hygiene have determinate the way of feeding in each historical period. Feeding bottles, developing infant formula and advertisement have had an impact for popular feeding method which had positive or negative an effect.

1.1 Child development

A definition of **child development** can be summed up as a normal progression when a child grows up that means changes by gaining knowledge, refining abilities and observing behaviours of others. It improves by assessing, copying and understanding connections and relations, folding context.

Developing of the each personality is a responsible, demanding and serious commitment. The main mission of every family is children's upbringing. It is a long-term process of showing and raising the characters of children and creating the identity and confidence. The right upbringing form is the positive approvals which motivate. A developing and growing child needs a comprehensive education included movement, social understanding, health and hygiene. It is really important to make ideal conditions and space for their raising in each aspect. There are two words "growth and development" which are joined together to specify children development. [1]

Growth is a change of a body size – a child grows in weight, height and also other body proportions.

Development is increasing of abilities in the four areas: physical, social and emotional, intellectual and communication and speech. All areas are interconnected to be aware and pay attention of children's behaviour and their changes.

Physical development - the skills of body muscles which are divided to gross motor development and fine motor development.

Social and emotional development – a human identity and self-image which are related feelings, relationships and a way of living in the society with others.

Intellectual development – gaining of knowledge, the abilities of understanding/ learning/thinking and considering.

Communication and speech – communicating and building relationships embracing family members, friends, colleges or partners. Except of verbal communication there is also non-verbal communication – facial expressions and gestures which are inseparable part.

It's a process which involves growing, learning, improving abilities including sitting, crawling, walking, dancing, talking or even singing. The developmental milestones are learnt during predictable time. [2]

Division interval of age from a birth to adulthood:

- **newborn** (ages 0 – 4 weeks);
- **infant** (ages 4 weeks – 1 year);
- **toddler** (ages 1 – 3 years);
- **preschooler** (ages 4 – 6 years);
- **school-aged child** (ages 6 – 13 years);
- **adolescent** (ages 13 – 19 years).

What can have an influence by developing social and emotional features of a child behaviour and character during early childhood? Does early experience have a strong impact in adulthood? Children's experiences affect the brain working –it is a way of responding to stress situations, unexpected reactions or ability to create believing relationships between family members, friends or with partners in the future. Motor abilities form, thinking is becoming more fluent and toddlers become aware of their needs, feelings, reactions and their interaction with others. The wide-ranging understanding of human behaviour (included reactions, decisions or just being) is important part of a lettered approach to improve design and its importance in the science area. [4]

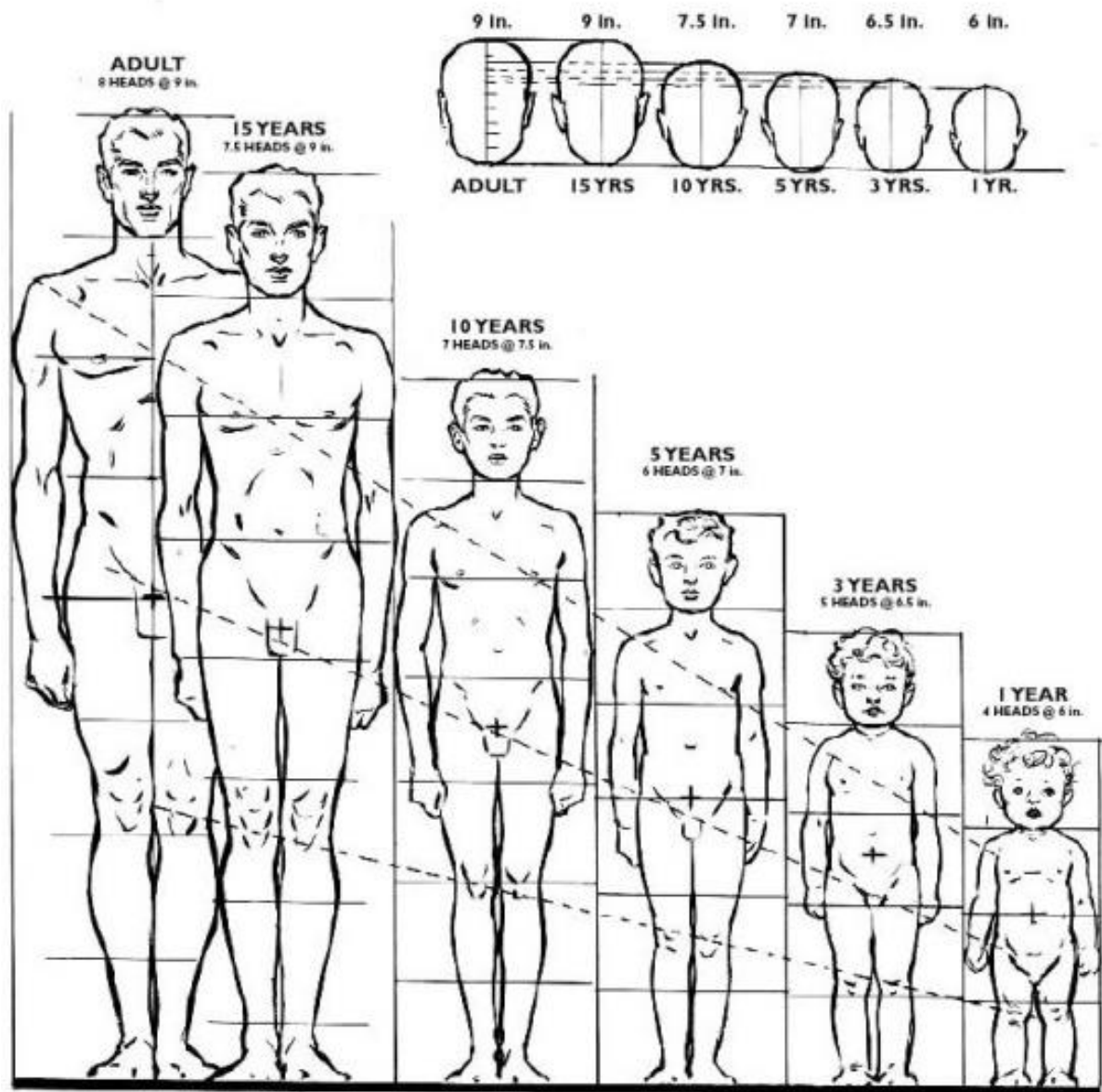


Figure 1. The proportions of growing human body.

1.1.1 Motor milestone abilities

Each child starts developing their motor abilities at their own pace, there is no exact guidelines, so it's impossible to say exactly when a child learns a given skill. The factor that has an influence for developing is the environment where a baby grows up. Every area of development – cognitive, physical, linguistic, social, spiritual and emotional, is equally relevant.

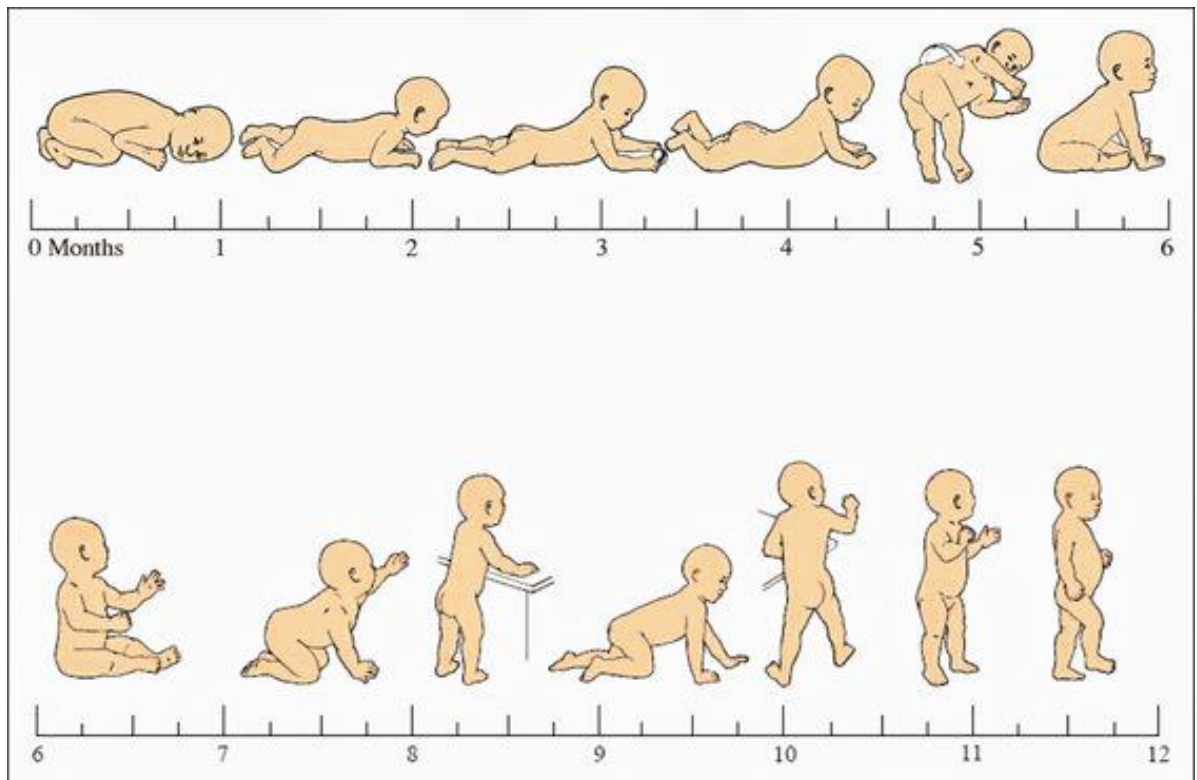


Figure 2. Chronicle progression of gross motor development.

Month n° 1 Newborns perceive the world differently and they are reliant on their parents or carers. In the first six weeks a child and his mother have to adapt to each other and learn a lot. Children manage themselves by physiological flexion. A child copies a position which spent in the womb. The baby keeps spreading a little, more movement of basic manners is done. We can also recognize some head movement and eye contact to react to some sounds. A bond which a child and mother occur between them is crucial to build their further relationship.

- arms and legs movement more fluently
- eye – contact with familiar people
- lifting head when a child is placed on tummy and is held perpendicularly by person

Month n° 2 Mother and her baby are getting used to their system of sleeping and awake times. They are able to start to control their head and neck movement, development of crucial satisfied moves, for examples, like bringing hands to mouth or nose. He/she starts observing the surrounding to gain more experience which helps baby's brain expanding.

- try to lift and turn from side to side with head

- interaction between baby's hands and months
- attempt to turn from lying on back to movement by head
- watch objects around them

Month n° 3 A child begins to hold head in midline. A supine baby tries to lift head when he/she is placed on tummy, slapping and fisting with hands, lying on tummy to push off pad. There are visible steps of progressing.

- holding head when a baby is supine
- lifting head when he/she is in prone prop position
- join hands together when a baby supine
- attempt to catch some toys and objects
- make sounds to respond parents or other present person

Month n° 4 – 6 There are some beginning movements in several positions. Toddlers are quite active and they can't stay alone without supervising for long. Develops in different stages are visible and a baby really enjoys playing and spending time with some peers and people, in general. However, the places have to be safety – proofed and parents have to be really careful about each activity of their toddler.

- rolling from side to side
- both hands are used for clasping, touching and grasping objects
- playing on the side
- able to hold head in supported position

Month n° 5 Babies are more moveable – bringing hands and feet and holding for a while, rolling from belly to back, objects are relocated from one hand to another one or even holding two things in each hand. Five-month old toddler is able to hold a bottle independently.

Month n° 6 It's the time when a child is taught to sit alone for a while (5-10 seconds) with supported hands on his back. Children are active to get some toys which are accessible to touch during tummy time, eye-contact following of objects. They are able to feed them-

selves with bottle and hold small objects between fingers and thumb. In general, their hand starts using separately. They roll from prone to supine

Month n° 7- 9 Independence of movement is become exciting for children. They are able to sit, move quadruped or standing with support, some attempts of crawling. They pull to stand and move around furniture.

Month n° 9-12 Toddlers continue being more creative and active to play. Parents involve child to several activities and new experience with kids in the same age. Moving like climbing, walking, dancing to help facilitate gross motor development. Most of them start realizing their characters and self-regulation. They are able to mimic motions and fear in case they don't feel comfortably and securely.

1 year to 2 years Their mentality is growing up which means to be aware of themselves and things happens around. Some new capabilities can be seen as delight and joy of moving ahead - assertiveness and certain independence.

2 year to 3 years Children want to try, see and explore things surrounding them. Creating of an own view and opinion, a strong self and self-reliant skills and abilities. Developing notions about their character and look as pretty, good, suitable, bad, ect.

3 years to 4 years In this period of life, children begin to be more social open in other children and want to be a part of game with others. They are able to play and share toys with kids. [2] [3]

1.2 Anthropometry

Anthropometry is a branch of human science dealing with human measurements – body size, shape, mobility, flexibility, working capacity. The variability of human bodies requests understanding and adjusting in the design solutions.

Anthropometry is a part of basic special methods of anthropology, a science about mankind, development, culture and others. It is a system of anthropometric points on the head, trunk and extremities which were determined internationally. They are placed where the human skeleton is not covered by fat or muscles, just by skin. [1]

A human body and its dimensions are various, they are influenced by age, gender and its proportions, races and an effect of dimension differences are brought about work and a way of spending leisure time. Height is impacted by diet, climatic conditions during an evolution.

The designers have to think in advance who their target group of users of considering the human dimensions is. The needs of each target groups are needed to determinate for separate product dimensions. The correct product size done applying anthropometric data is important to design [5]

1.2.1 History of anthropometry

In ancient Egypt the tomb painters had a modular grid for the preparation of the human body for drawing. The standing figure was divided into fourteen same parts and the grids had some certain determinated anatomical points. In classical time, the theory of proportions assumed a deeper significance. [1]

However, its basics have been reached in the first century BC. The most detail system of the human proportion which has been done by Marcus Vitruvius Pollio. The Roman theorist of architecture, architect, engineer and author of *De architectura*, a book known as *The Ten Books on Architecture* today written around the year 15 BC, where he mentioned human proportions. Most of his „body-part-ratios“ are familiar from archaic units of measurements. He made it clear and respected human proportion as a fundamental principle of building design. [1] [5]

“For the human body is so designed by nature that the face, from the chin to the top of the forehead and the lowest roots of the hair, is a tenth part of the whole height; the open hand from the wrist to the tip of the middle finger is just the same; the head from the chin to the crown is an eighth, and with the neck and shoulder from the top of the breast to the lowest roots of the hair is a sixth; from the middle of the breast to the summit of the crown is a fourth. If we take the height of the face itself, the distance from the bottom of the chin to the underside of the nostrils is one third of it; the nose from the underside of the nostrils to a line between the eyebrows is the same; from there to the lowest roots of the hair is also a third, comprising the forehead. The length of the foot is one sixth of the height of the body; of the forearm, one fourth; and the breadth of the breast is also one fourth.” [6]

The passion in the proportion of a human body had also an Italian Renaissance polymath Leonardo da Vinci. One of the most famous drawings is “Vitruvian Man” by Leonardo da Vinci, a male figure drawn circumscribed a square and a circle. His statement was that the centre of the human body is a navel. The theory of human proportions became an illustration of the golden proportion or golden ratio. [1]

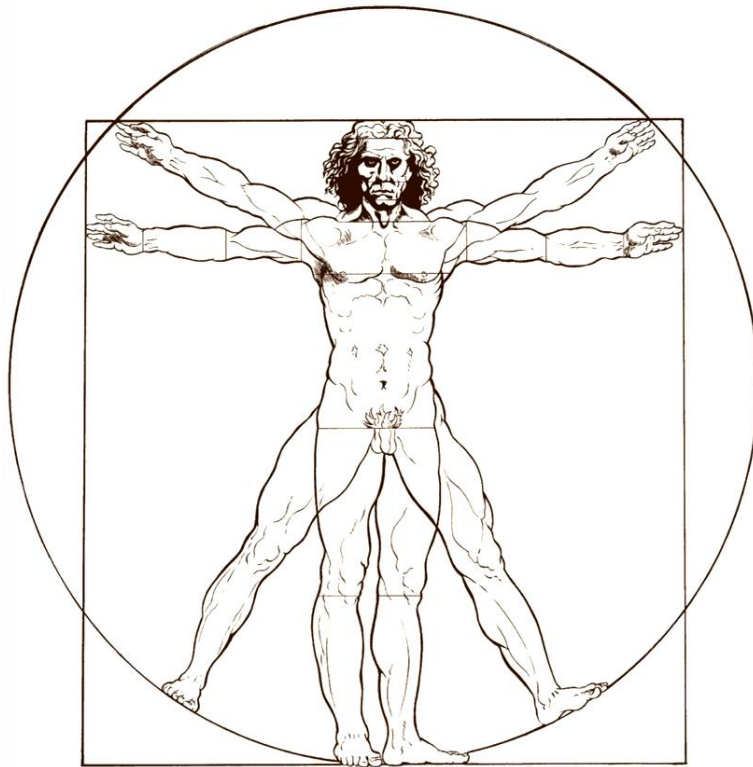


Figure 3. The illustration of Vitruvian Man by Leonardo da Vinci.

Albrecht Dürer was a talented Renaissance artist who studied anatomy. He wrote the book *De Symmetria Partium in Rectis Formis Humanorum Corporum* which was a part of his larger work *Four Books on Human Proportions* inspired by Marcus Vitruvius Pollio, Leonardo da Vinci and other great inventors. The unique work of Dürer's interpretation of humans of different shapes and size which displayed diversity of men's and women's bodies. His drawings tried to disclaim the absolute beauty based on ideal proportions done by Vitruvius. His aim was highlighted the natural dispositions of all different figures and to innovate the science of the human proportions. The last Dürer's work discussed the issue of comparative and differential anthropometry. [8]

Anthropometry is dated from the end of 20th century and was applied in the criminalistics. The connection anthropometry and design application began using in the 20 years of the 20th century, mainly the connection of anthropometry and furniture solutions.

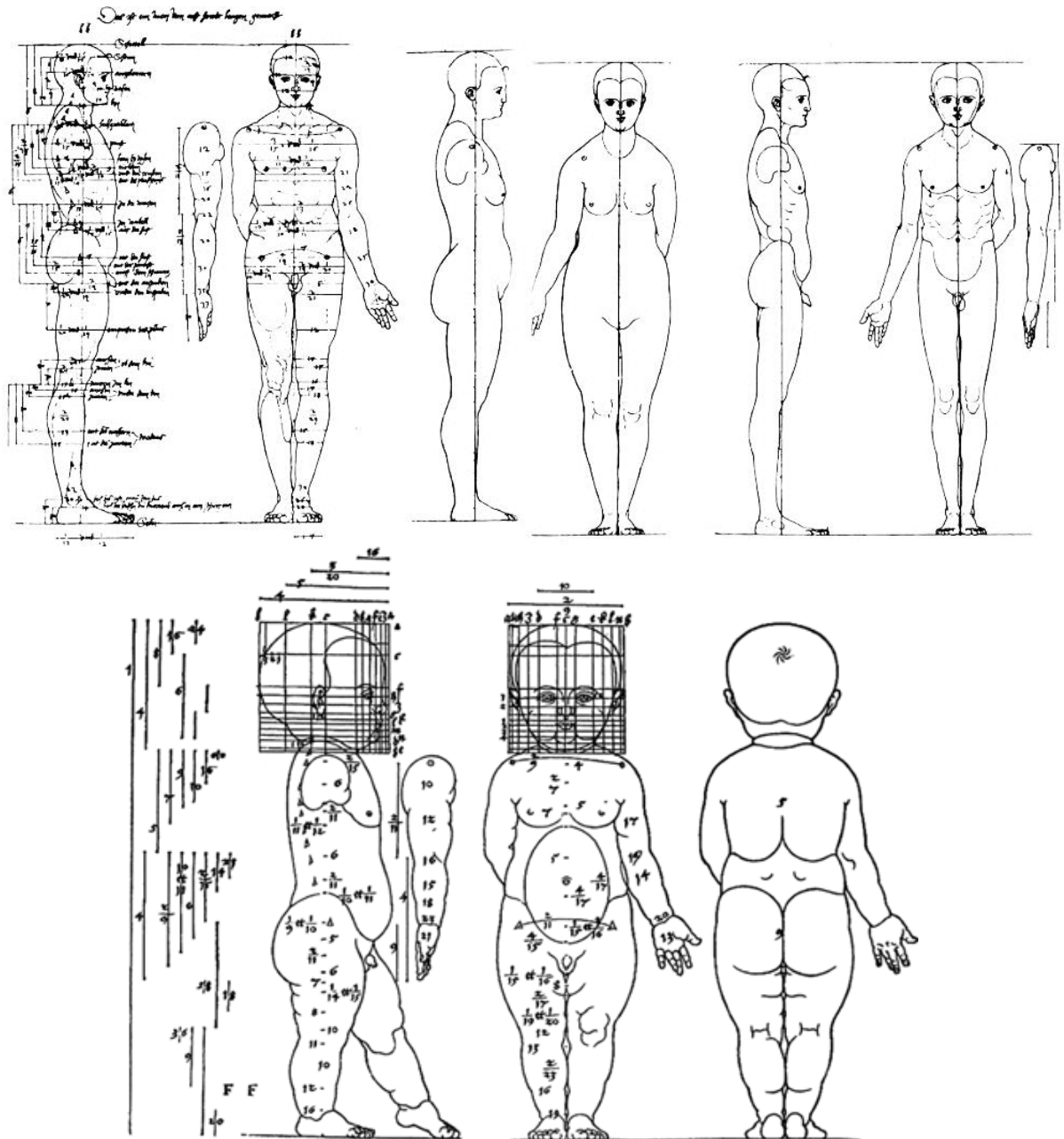


Figure 4. The book *De Symmetria Partium in Rectis Formis Humanorum Corporum* and the illustration of a baby by Albrecht Dürer

One of the first who started to interweave the proportion of the products according to human measurements was a Danish designer Kaare Klint. All sources which were needed for designing, he obtained by the anthropometric measuring with his students. His attempt was to create furniture for human with suitable proportions according to anthropometry much better than furnishings had done earlier. As a design theorist emphasized craft tradition and craftsmanship. [5]

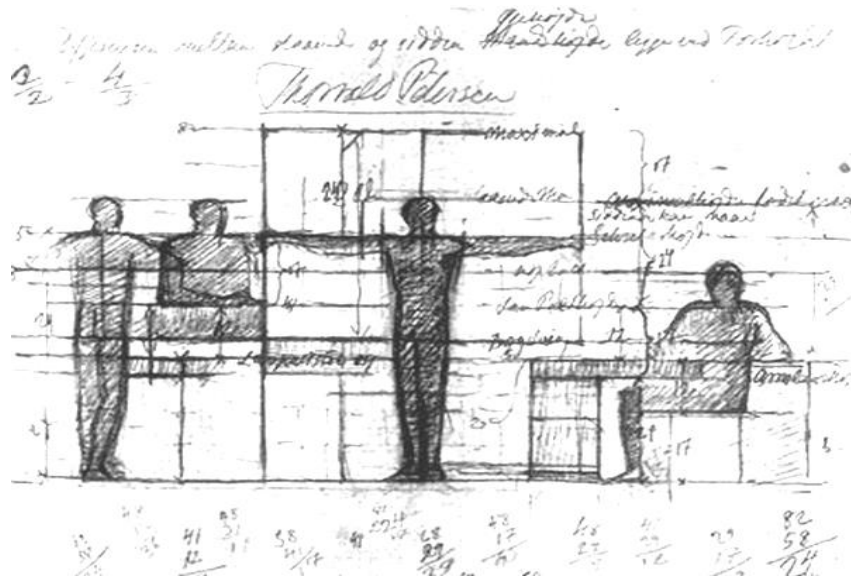


Figure 5. The anthropometric sketch by Kaare Klint. 1920's

Application of the anthropometry in design was more popular after World War II. In commercial sphere the data has been served for clothes for military uniforms, automobile seats or plane interiors. The American industrial designer Henry Dreyfuss included the anthropometry as one of the designing ergonomic tool. He created ideal models of a man and a woman – Joe and Josephine for verification of the anthropometric parameters. [7]

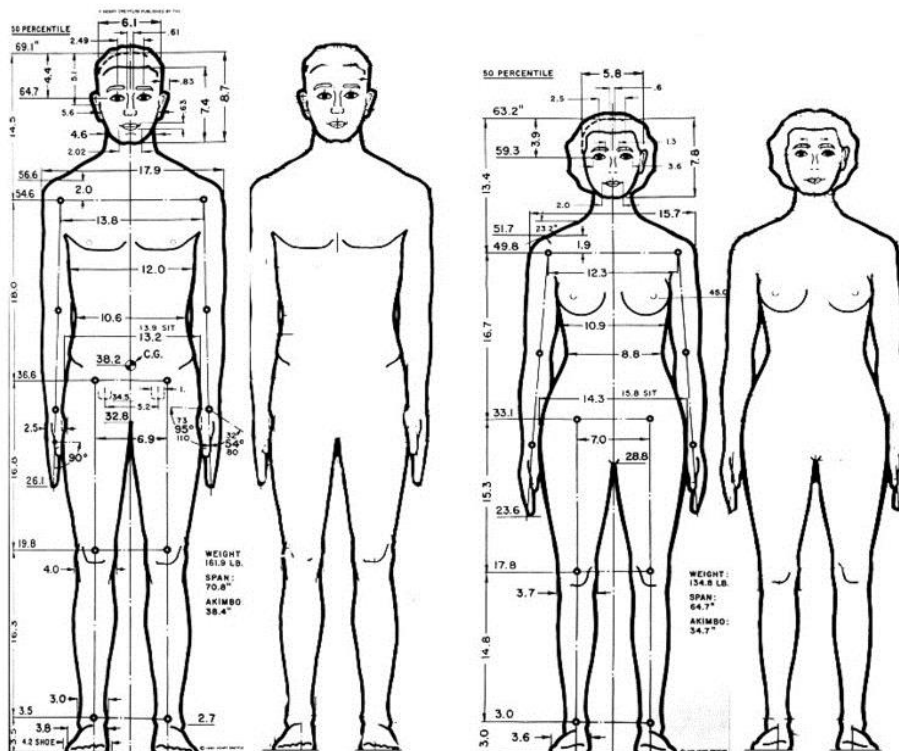


Figure 6. The modulator of Henry Dreyfuss – „Joe and Joshepine“.

Another important influence in application of anthropometry is a Swiss-French architect Le Corbusier who devised “the Modulor” – an anthropometric scale of proportions. After considering he applied the human height of 175 cm but then he changed it for the weight of 183 cm to unify the imperial and the metric system. Le Corbusier’s system was based on the height of a man with his lifted arm. The modulator was created to bind in the long tradition of Vitruvius Leonardo da Vinci’s Vitruvian Man and the work of Leon Battista Alberti. It is inspired by golden ratio – the proportions are based on the ratio of any two parts of a complex, the mathematical relationship: $B = B : A + B$ (Fibonacci sequences). The harmonic principle is used in the area of arts, architecture and others. Le Corbusier’s intention of a new metrical system was to introduce a module with realistic human proportions into architecture and design. The Modular has been the crucial influence, especially in design. [1] [9]

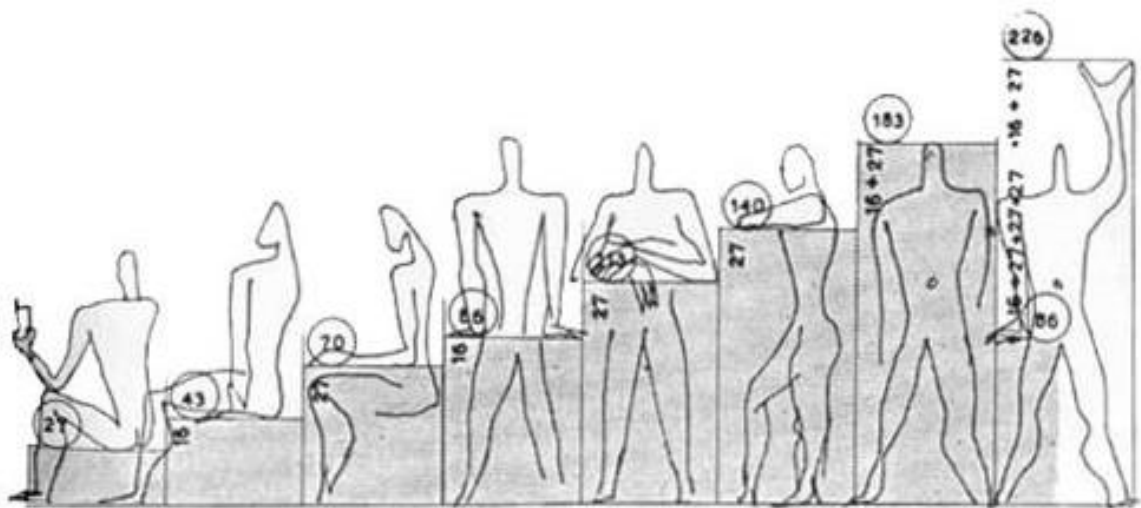


Figure 7. The Modulor by Le Corbusier

1.3 Historical overview of baby feeding

From the historical overview there are several ways of feeding used in these days. An infant after birth has been fed with wet nursing, the feeding bottle and formula from Ancient Roman times till the present trends of popular bottle feeding and diminishing of breastfeeding.



Figure 8. The paintings from 16th century which were painted by Joos van Cleve - *The Holy Family* (Vienna) and by Lucas Cranach (Norway) displayed breastfeeding.

Wet nursing

A wet nurse has been a profession of women feeding another child with breast's milk was known before 2000BC and lasted until the 20th century.

During the time period, it was in a position of requested feeding (2000 BC) to the possibility of choice (950BC to 1800AD). Wet nursing was using till the feeding bottle was invented in the 19th century (despite the fact there were some demur against breastfeeding in the Middle Ages and the Renaissance.)

From the point of religious view, it was deemed necessary to breastfeed children as a religious obligation in Israel.

In ancient Egyptian times, wet nurses were really needed to cover lactation failure. Even there are few mentions of using artificial feeding. (Yes, in ancient Egypt.)

In Greece, higher social women required to own wet nurses. In the Bible it's a mention of hired by Pharaoh's daughter of wet nursing called Moses.

At the time of Roman Empire, the upper class bought unwanted babies as cheap goods. The infants which were undesirable females left in the rubbish piles. During three years, the wet nurses which were also their slaves, fed and raised the babies. Wet nursing service supplied including of breastfeeding, taking care and wage.

In the Middle Ages (1220 AD and 1250 AD) women feeding other infants were requested of qualities and duties. She had to take care about boys in all aspects. Breast milk was esteemed as magical qualities, physical and psychological characteristics could be passed on.

Throughout the Renaissance period, the most advantageous option of wet nurse feeding continued whose mothers were disabled to feed the infants. Of course, there were appeared some moral convictions of mothers feeding their own infants. However, the preferences of wet feeding and employed women as wet nurses were changed and affected by rumours and in specific period.

A wet nursing job stayed on really well paid position and a feasible profession chosen by poor female. They fed own child and then they search for a job as wet nurses. For example, in France it was compulsory to register at employment offices. The wet nurses had to raise up a child till nine months and then they could breastfed somebody's else baby.

Naturally, the law ordered many breastfeeding rules which were determined to social classes. Also wives of important people, such doctors, lawyers, merchants were leading husband's business, care about family and household, mainly because it was much cheaper to give employment to a woman.

The end of 18th century through the 19th century and later, the beginning of the Industrial Revolution brought a lot of changes which influenced wet nursing. It wasn't anything lucrative to work as a wet nurse and raising living cost forced them to find other jobs with steady income to provide their families.

Wet nursing was basically vanished in the 19th century. It was replaced by artificial feeding by the feeding bottle which had many advantages and it have been filled in cow's and goat's milk. [10]

The feeding bottle

Evidences of bottle feeding have been found in ancient times, containers of different shapes and size were determined thousands of years BC. Rough bottles, utilities and troubles with cleanliness were mentioned from the Roman Era till the Renaissance. Subsequently, feeding was refined with hygienic bottles during the Industrial Revolution.

First available knowledge of clay feeding containers is dated from 2000 BC founded in the infant's graves. There are a wide range of devices used for feeding animal's milk. They

were made from ceramics, animal's horns or wood. The most regular way of feeding bottle was a perforated cow's horn in the Middle Ages. Most of infant-feeding utilities made from silver or pewter.



Figure 9. The historical overview of feeding bottles.

In 1770 Hugh Smith, a physician at the Middlesex Hospital in London, invented a bubby-pot for feeding babies. It was filled with liquid food. Which a child sucked upon the perforated spout formed a knob like they would on a baby's bottle today. The spout was often covered in cloth.

In Europe, a pap boat was a feeding vessel in 16th-18th century. Children were fed with pap which consisted of water- soaked bread or panada consisted of broth-cooked cereals. (Panada is a kind of bread soup, in British cuisine it may be tasted with sugar, nutmeg or zante currants.) The pap boat was composed of a spoon with a hollow stem. However, there was a big issue of hygiene. Bottles, teats or boats weren't cleaned properly which caused unfavourable effect to the infant's health. Dirty feeding utilities and bad conditions of milk storage ran to the death of many infants which were artificially fed in their first year of life.



Figure 10. The historical overview of feeding bottles.

The mid-19th century, the Industrial revolution brought access to glass bottles. The first highly-worked feeding bottles were designed in 1851 in France. It had a cork teat and air inlets to regulate flow. In the same time, it was more popular a spoon feeding way or a child was nursed straight from animal's teats.

In 1896 there was created open-ended, boat-shaped bottle which was well sold in England till the mid-20th century. Teats were originally made from leather or cork, in 1845 Indian rubber teat appeared but they were a repugnant taste and infants refused them, lately they were refined.

Such a huge stride of modern feeding bottles and teats which have changed accessibility of wet nursing, feeding of animal's milk and infant formula and society meanings. The first medicine began to develop infant nutrition formula as alternative milk feeding source. [10] [11]

Infant Formula

The best source of infant nutrition is constantly considered breast milk. During the time 2000 BC, animal's milk was most commonly used for infant feeding. The evolving process of alternative source of milk substitutes has grown enormous speed. The huge involvement of artificial milk's popularization was made by advertising and a negative effect for breast-feeding. The end of the 19th century, animal's milk was the most accessible artificial source. A pap and panada which were mentioned in the feeding bottle part that were used as extra supplements of feeding. Children were fed different kind of milk, which was available (sheep, goats, donkeys, camels, horses or cows which was the most common ones.)

In the 18th century, there were first experiments of analyzing chemical structure of human milk and animal milk. Based on chemical characteristics of several results, Des-Essartz stated mother's milk as the best source of infant nourishment. Subsequently, many scientists had an effort to develop artificial milk to resemble human milk.

A chemist Justus von Liebig created, then he patented and marketed an infant food as a liquid and later as a powder form in 1865. His infant formula consisted of cow milk, wheat and malt flour, potassium bicarbonate. Developing of artificial nutrition continued, in the 19th century food preservation was advancement. Important invention followed of creating evaporated milk patented by William Newton in 1835.

Of course, the popularity of formulas and other artificial products were caused by the marketing of Liebig's infant food. There were 27 patented brands of infant food in 1883. However, this was just a beginning of enhancing structure.

The reason of many infant deaths was caused of unfavourable hygienic conditions. Improvements of cleanliness and the quality of milk supplies refined in many ways. Rubber teats were possible to take care properly in 1912 and plenty homes started to storage milk correctly. In 1920, nonmilk-based formulas began developing for allergic to cow's milk. It was consisted of soy flour lacked vital nutrients and vitamins.

The opinions of feeding with artificial milk has really negative influenced on natural breastfeeding. The researches even have shown undesirable influences which cause civilization diseases. Currently, the issue has been debated yet many experts have agreed that children should not be a substitute prefers defined before breast-feeding. [10]

1.3.1 Baby food in different countries

Soft and easily swallowed meal is a replacement of breast milk or infant formula. A child usually switches to baby food between the age of four to six months and two years. There is an offered question: "what can a infant eat instead of breast milk?"

The right answer mainly depends on the country where parents and children live. These babies' diets are usually joined with religious, culture traditions or different fare and economic situation in the families. There are some examples of the common first baby meals around the world.

China and East Asia

A change from breast milk to rice dishes completed with fish, seaweeds, eggs or carrots when a baby is four- month-old. They also eat some porridge consisted of milk, green beans and bananas. The menu also has the chicken soup, pumpkin, ground pork or mashed aubergines.

France

French babies are fed with the vegetables – spinach, beets and endive or leek soup. Some titbits consist of soft cheeses, couscous or quinoa for one-year old toddler.

Hawaii

Poi is the island treasure of hypoallergenic qualities and gluten free food. It is a fermented paste made of the taro root plants which is an essential component of food in Hawaii.

India

After getting used to rice cereal and mashed rice in their six months, they start to consume “khichsi”. This meal is a traditional vegetarian consisted of rice, lentils, vegetables and a range of spices like coriander, mint, cinnamon and others.

Italy

Six months old babies enjoy chicken, purees and broth made of vegetables sprinkled with olive oil and crumbs of parmesan.

Jamaica

Fruit and fruit blends like mango, papaya, banana or custard apples with honey are served to four-month-old infants.

Japan

Little Japanese eat “miso soup” during their first year. A rice porridge called “okayu” is served with dried fish, vegetables or mashed pumpkins on the top.

Kenya

The first solid meal of six-month-old children is “ngwaci”, sweet potato served in Kenya. It is an easily digestible starchy root vegetable with vitamin which helps develop immune system.

Mexico

An unusual habit of Mexican parents is to flavour apples, oranges or pears with chilli powder and lime to support taste buds. Rice, beans or soup are the main parts of babies’ solid menu in Mexico and Central America.

Peru

Peruvian babies’ diet is composed of “granadilla” which is the pulp without the seeds. It is a type of sweet passion fruit full of minerals and vitamins.

Philippines

The inhabitants of the group of islands know the recipe for the magical cure for flue and immunity. “Lugaw” is a rice porridge cooked with chicken broth, garlic and ginger

Sweden

A wheat cereal called “välling” or mashed fruits and vegetable are the starter of Swedish babies.

Vietnam

The main sustenance of Vietnamese babies are served porridges and broths high in fibre, fish sauce and pork bones to flavour. Butternut squash, carrots, potatoes, shrimps are added in soups.

Tibet

The Tibetan ritual happens on the fourth day from a birth. It means that a piece of “zamba” which is stuck on the forehead of the infant. Zamba consists of barley, wheat, corn, and peas stirred, fried, and ground into flour and mixed with yak butter. [12]

And what is a note of this chapter? What is diverse?

All babies are same age, but they have different background and the countries where they grow up. All of them live their own childhood influenced of the cultures, races and religious. Each solid food is built up from the local groceries which contains of a lot of nutrition and vitamins.

1.4 Baby feeding utensils

The current market for babies offers a huge range of choices for many products which are necessary for feeding newborns, infants or toddlers. The market supply is so gigantic, it 's easy to get lost what you really need and what things are kind of multifunctional but inapplicable uselessness.

Some utilities are needed depended on the weeks, months, situation or other. However, feeding is vitally important activity for first few months of each baby.

The most beneficial choice of baby's feeding utensils:

- bottle for breastfed babies
- sterilising equipment
- bib

- baby training cup
- cutlery
- bowls and plates

Bottle for breastfed babies

The feeding bottles have started using during industrial revolution in the early 19 century and in some sense they forced out breastfeeding for some period. Actually, the scientists have a same statement of the healthiest feeding by mother's milk.

They are the most used baby's products which can be consider as the main compensation of mother's breasts. The shapes, sizes and materials have a wide portfolio of options. The teats of feeding bottles are contoured as mother teat copying their shape.

We can divide baby bottles based on the material – plastic and glass.

Glass bottle is good at cleaning. The advantage of the solid surface is mainly easy to keep hygienic and any gems and moulds could not be hidden in the scratches of the bottles.

Glass is more resistant to temperature changing and keep liquid warm longer. You can consider the weight as the disadvantage and the danger of breaking. However, buying the silicone bottle covers pretend them.

Plastic bottle is unbreakable and much lighter than glass ones. It's more suitable for older children who can hold bottles themselves. However, there is bigger challenge to keep plastic bottle hygienic, so it's recommended changing them often. Many companies also offer anti-colic feeding bottles which are designed for reducing the amount of air during time your baby is fed which it could be a reason of colic. The European Union, US and Canada have prohibited use bisphenol A (BPA) in the baby bottles which is harmful and could endanger or harm the children health.

The choice of feeding bottle is different if you need bottle for just newborns or older toddlers. We can divide them according the volume – small, middle and large.

The small bottles are for newborn till 6 month old baby which a volume is 120-125 ml.

The middle volume has from 210 ml till 260 ml for milk or other liquid.

The large bottle types have 330 ml and they are specified to older children for drinking.

[13]



Figure 11. Different examples of feeding bottle.

Sterilizing equipment

The immunity of newborn has not had time to gain the antibodies necessary for immune support; their body is quite sensitive for germs. All utilities should be sterilized to avoid potential disease. Of course, our mothers didn't have such a big range of ways how to sterilize in past. They used to boil bottles, teats and others in the pot.

On the market, there are 3 types – cold water, microwave steam and electric.



Figure 12. Microwave steam and electric sterilisers are options which can be used.

Cold water sterilizer doesn't use heat to sterilize utilities. It uses regular water and special tablets or liquid. All things must be immersed for at least half hour and more. The sterilizing tablets have a peculiar smell and taste which babies may refuse a bottle. The disadvantage is quite a long time to sterilize; this way is preferred at the least.

Microwave steam sterilizer is a vessel where the utilities are inserted with water and sterilizing bags which takes between 3 - 8 minutes. The microwave heating kills germs and things are sterilized around 24 hours covered by a closed lid. A size is really convenient for travelling.

Electric steam sterilizer is a simple, effective and no chemicals needed equipment which takes 6 - 15 minutes. [15]

Baby training cup



Figure 13. Several children's training cups.

Their main aim of training cups (or sippy cup) is aid to turn from feeding bottle habits to use a regular cup or mug. The big advantage of a training cup is a lid with a spout that a toddler may drink safety. They can boost to develop motor skills by picking them up and hold them. Parents usually try to switch from bottle to a cup when a child can sit independently in the high chair. [13] [14]

Cutlery



Figure 14. Different kinds of toddler's cutlery for learning.

Using cutlery properly is a three-stage process of introducing each of them. A spoon is the first, and then a fork and finally a knife should be a regular part of dining. A toddler should master feeding with a spoon individually between 10-14 months.

Cutlery should have short sturdy but comfortable handles to get to grips with them. The best way how to help them make a eating manners is to sit down to eat with the babies. They learn so much by observing and copying what their parents do. [14]

Bowls and plates



Figure 15. Eating with cutlery (even the toddler's version) is a great milestone.

The right choice of tableware might help avoid unexpected mess in the kitchen or dining room and weaning products for toddlers can attract each tiny fussy eater to switch off the feeding bottle. Parents start to feed their babies with deeper bowls not to spill and some shallow bowls are more applicable to babies for self-feeding.

Tableware is usually made of several materials - glass, metal, plastic or silicone. Glass is a dangerous choice for such a small toddlers. They can be drop / push off on the floor, so glass tableware should be used for older children. The plastic version is unbreakable, microwave and dishwasher cleaned. The choice should be careful and they must not contain BPA. Silicone is free of BPA, unbreakable and usually dishwasher-safe. Most of them are allowed to heat in the microwave. [14]

Bib



Figure 16. Several version of children's bibs from rubber, textile, paper and plastic.

Bibs are handy aids which catch most of food and drinks in/on them during feeding time. The main function is to avoid children to stain their clothes. The current market offers many possibilities of different materials, shape solutions, sizes and colours. They are available in several material options - textile, rubber, plastic or paper.

Paper bibs are useful for travelling or in the public space. They are disposable, two layers to make them stronger and waterproof.

Textile bibs are made from cotton, polyester or textile with rubber finishing to make them easy-cleaning. They used to be bought, because they were available and quite cheap.

Plastic and rubber ones are made from polypropylene (PP) and thermoplastic elastomer (TPE) and most of them are very easy to clean, just wipe with a damp cloth or wash in the dishwasher. They became popular for washing and some design bibs have pockets which catch liquids or food. [14]

2 CHILDREN'S FURNITURE

Some available information of children's furnishings have been still preserved from the period of ancient Egypt. However it hasn't been extended commodity at all. Actually, if any piece of furniture was found it would have been occasionally. First children's bedrooms have been appeared since the time of aristocracy. Later they were spread out in the townsman's dwellings during the Biedermeier period in the Czech area. First separate children's bedrooms have been broaden out only between the wars in the 20th century. [1]

2.1 Development of children's seating

How the author has already mentioned in the beginning of this chapter, the popularity of children's furniture has spread out during the interwar period. The beginning of the 20th century was a strong influenced by Scandinavian design which became an icon of the simple functional furniture. [1]

Ancient Egypt



Figure 17. The children's high chair with the footstool from the Tutankhamen's period.

The children's furniture has been already existed in ancient Egypt. There was discovered a pharaoh's children chair and footstool in the tomb of Tutankhamen. They are made of cedar wood, decorated with ebony, ivory and gold pieces of the strips. The restraints were decorated with a relief of Capricorns and some desert plants, the chair's legs were shaped as the lion's paws. The dimensions of the chair and footstool were done for children's parameters and a bent seat could be meant one of the first ergonomic solutions. [1]

The high chairs were occasionally appeared in the past; the children's furniture followed the trends like the adult furniture. Some pieces have well worked-out details, a high value or a functional sense.

1600

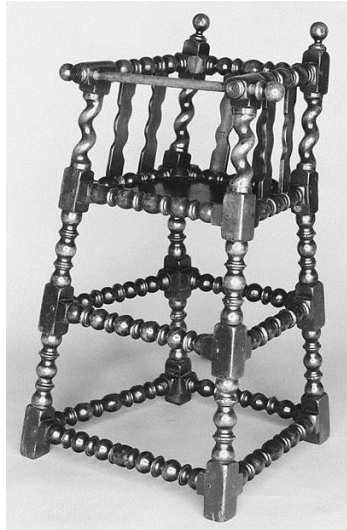


Figure 18. The high chair from 1600.

The British high chair from the end of 16th century which is made of walnut wood exhibited in the Metropolitan Museum of Art in New York. [16]

1650



Figure 19. The high chair from 1650.

A children's high chair which is dated around 1650 has British origin and made of oak wood in the Metropolitan Museum of Art. [17]

1710–20



Figure 20. The high chair. 1710-20.

Another handcrafted high chair is made from ash, oak and marple. It's dated in the years between 1710- 1720 of the British origin. [18]

1860-1899



Figure 21. The British high chair.

It has a four metal wheels mounted on the legs and a moveable wooden feeding tray which was added as a part of design in the 19th century by manufactures. Originally, there was a possibility to place close to the table. However, the tray has several purposes: it holds a child more safety, offers the playing surface and avoids spilling some liquids. The great

advantage of this high chair was a modification to a rocking chair using two handles. The legs are curved to allow the transition, so the legs become the rockers. [19]

1873



Figure 22. The High chair PETIT 114 by TON.

The children's high chair was manufactured by the company TON in 1873 and has been still produced. Suitable for feeding, and has a reclining small tray, footrest and safety belt.

The company was established in 1861. The location of beech woods was the suitable place for the manufacturing process to get enough material. The founder Michael Thonet chose a small town Bystřice pod Hostýnem in accord some advantages – no transportation of materials and the offer of jobs for local people. The unique industrial organization system was used in the manufacture. The workers specialized in only one task and used unique technologies for producing the chairs of reasonable price to expand all over the world. The original name of the factory was a name of the founder Michael Thonet.

After the World War I, the economic situation forced to join with the Kohn-Mindus stock company and Thonet factory changed its name to Thonet-Mundus. It lasted until 1940.

Thonet had to follow a regulation of the Ministry of Industry in 1946 and it was renamed as TON (the abbreviation for “Továrna Ohýbaného Nábytku” – a translation is bent furniture factory). After Velvet Revolution of changing the political situation in 1989, the company was a state enterprise of the Czech Republic. Ton has become a joint stock company since 1994. [20]

Late 19th century

Figure 23. The children's high chair.

The left wooden chair from a late 19th century is handmade by Jonathan Jacobs himself. The high chair passes through sons of the family. It is an old-fashioned Windsor style (ordinary in the 18th century). It doesn't have any tray which was common, there is a footrest and a metal eye under the seat for a safety strap. [21]

1940

Figure 24. Dutch design of the high chair.

The high chair of unusual material combination was made in the Netherlands 1940. The frame consists of a nickel plated tubular, a red vinyl upholstery and plywood parts. It is suitable for a baby from 6 months. [23]

1965



Figure 25. The baby chair 616 by Ben af Schulten.

Modern of 1960's design brought a high chair in the spirit of Finish bending furniture. The high chair manufactured by Finnish Artek which was the first company of the bending furniture led by the worldwide famous architect and designer Alvar Aalto.

Ben af Schulten was a Finnish designer based in Artek company. His Baby Chair 616 was made of the hefty birch legs and the back from a bended lacquered piece of birch plywood. The high chair is available in several shiny colours. [24]

1966



Figure 26. Gunnar Daan's design of the high chair.

Gunnar Daan, a Dutch architect and designer, devised an elegant high children's chair in 1966. The combination of the solid metal legs and wooden round parts that is more stable and heavy version. This was the first prototype built for his own children.

The product was sold by the company Metz & co. [25]

1970's



Figure 27. The high chair produced by Seiex.

One more excellent Scandinavian design is an orange high chair manufactured by the company Seiex in Sweden in the 1970's. This children's high chair made of a combination wood round legs and plastic parts of seat and footrest is a great example of mid 20th century Finnish design quality. An author of the product is unknown. [26]

2.2 Fundamentals of hygiene

The strict hygiene of newborns, infant and toddler is really important. The consistency of preparing baby food, cleanness of the surrounding or furniture in the first few month of a baby is very crucial not in order to damage to health through negligence.

- **Hygiene of place/room**

The importance of environment cleanness is where a baby spends the most of all time during sleeping, playing, eating. Dust-free environment, ideal humidity and temperature are fundamental for healthy progress.

Especially parents have to be patient and thoroughgoing with hygiene of new born babies which don't have a strong immunity system yet. They avoid contacting with people and spending first few weeks at home.

- **Hygiene of furniture**

Similarity as in the previous points it is responsible to keep higher hygienic fundamentals in order to prevent any complications.

The furnishings like cradle, high chair, changing table or play area - parent's bed, playing carpet or mat is necessary to clean regular from food, dust and other dirt.

- **Food and utensils**

Utensils like feeding bottles, cutleries, training cups and others are essential sterilized in first few months. All tableware used for feeding, mainly bottles and tits for newborns, are recommended to keep sterilizing.

Breast milk, infant formula or solid foods have to be served in the sterilized bottles or utensils and it has to be observed a strict hygiene avoiding food contamination. Food poisoning can bring about an unexpected and awkward situation which can destroy a child health (or even causes the death).

- **Hygiene of clothes**

Another part is baby clothes which have to be change several times per a day. Never ending put clean clothes on is connected to learn a baby eating and digesting food properly.

The old proverb says: "Cleanliness is next to godliness". There is something about the truth yet. [22] [27]

2.3 Fundamental safety requirements of children's furniture

Home is a place where a child spends most of the growing up time. The furniture and interiors that are mostly used by children should be designated for their age, gender, amount of users and also the space conditions.

In general, a shocking number of infant mortality is caused lack of supervision by parents or caretakers. The most often accidents belongs scalds or burns done in the kitchen or bath-

room; falls from the chairs, wardrobes or higher piece of furniture; gashes with broken glass or other sharp items; drowning or suffocation caused by inattention. Many injuries can be avoided foreseeing and preventing.

Another part of injuries are poisons by medicaments, poisonous plants, herb, trees, berries or mushrooms and chemicals. There has been even a warning campaign about lack of irresponsible storage cleaning stuff and washing powder caused a raising number of children's poisons. The best way to reduce the risk of injury is to avoid/ remove obvious risks and hazards which could have non-returnable impact. [1]

Safety requirements for furniture:

- The furniture shouldn't have sharp corners and edges. It 's recommended to used some furniture protective elements or mark with reflex colours .There is even better to use colours which can light in the dark.
- The furniture must be stable or fixed to the walls.
- We should avoid any piece of furniture which could stick out and a child may stumble over it and hurt himself/ herself or break a toe.
- Doors, cupboards, showcases and other pieces shouldn't consist of glass panels which might be a real danger of serious injuries.
- All surface finishing must satisfy every health requirements for children's furniture. These conditions are strict because there might be a risk of poisoning by licking and gnawing.
- The electric sockets must be protected with the plug protectors or power point covers.
- Suitable lighting is a crucial part of furnishings, especially in the bedrooms. It is recommended to have a motion-sensing night light. There are helpful in case a child gets up several times during the night. [1] [22]



Figure 28. Safety furniture elements avoiding injuries at home.

Products which help prevent an injury:

- **Door and stove barriers**

A barrier allows children to do playing safely in the next room but they can be permanently seen while a caretaker does something else. Door barriers are needed to prevent any falls if there are a stairs in the house or flat. The kitchen is one of the most dangerous rooms for children. Unfriendly devices which can make a serious accident are considered stove and oven. A stove guard covers the hazardous space to protect from burns and scald. The stove knob covers are applied to stop switching a stove or oven on/ off.

- **Locks and safety catches**

The market offers a plenty of locks, latches and catches to apply for most wardrobes and drawers. Dangerous chemicals and cleaning products must be kept in the locked cabinet or drawers. A fantastic protection element is a magnetic locker or elbow catch.

- **Safety tap caps**

The aim is to prevent burns from turning on a hot tap and safety tap caps are installed without difficulty.

- **Finger protection strips**

These stripes are quite new on the market. Their innovative and simple design ensures from trapping children fingers between the doors and windows.

- **Power point covers / plug protector**

The open power sockets are one of the most dangerous children's lures at home. The plug protectors and power point covers ensure from inserting any objects in the electric socket.

- **Doorknob covers**

They make difficult to open a door. The access disabled to the room for children.

- **Foam doorstoppers**

Children's fingers stay protected from crushing in the doors.

Parents should be thorough and responsible when buying children's furniture. They should make a priority of safety comfortable and high-quality furniture and protective products. They have to be aware of responsibility for healthy growing up of their baby. [1]

3 THE GLOBAL ANALYSIS OF CHILDREN'S HIGH CHAIRS

The chapter of the worldwide analysis is focused on the children's furniture design, especially children's high chairs. It has been divided according to the several conditions to make it well arranged and to see the current situation of the high chair designated for baby feeding.

3.1 Designers and manufactures dealing with children design

This part contains a choice of a few designers and companies which have been focused on design of children's high chair. The selection is subjective based on the author's research of the current products on the market and the extraordinary solutions of design and unusual details of the chairs.

The analysis has been divided into the several parameters and it is comprised of materials, variability, compactness and other supplementary adjusting equipments. The examples are not repeated through the sections of the diploma thesis; the author has done some division of the particular examples.

The social media or other online creative applications offer several tools to help make a research easier and available online any time or everywhere. The author's chosen online social application has been Pinterest which works as online a pinboard. You can create your boards to upload, save and manage your selections. It works as the personal archive – the boards can be private or open to everyone. You can connect to someone else's pinboard to be inspired or re-pin some pictures.

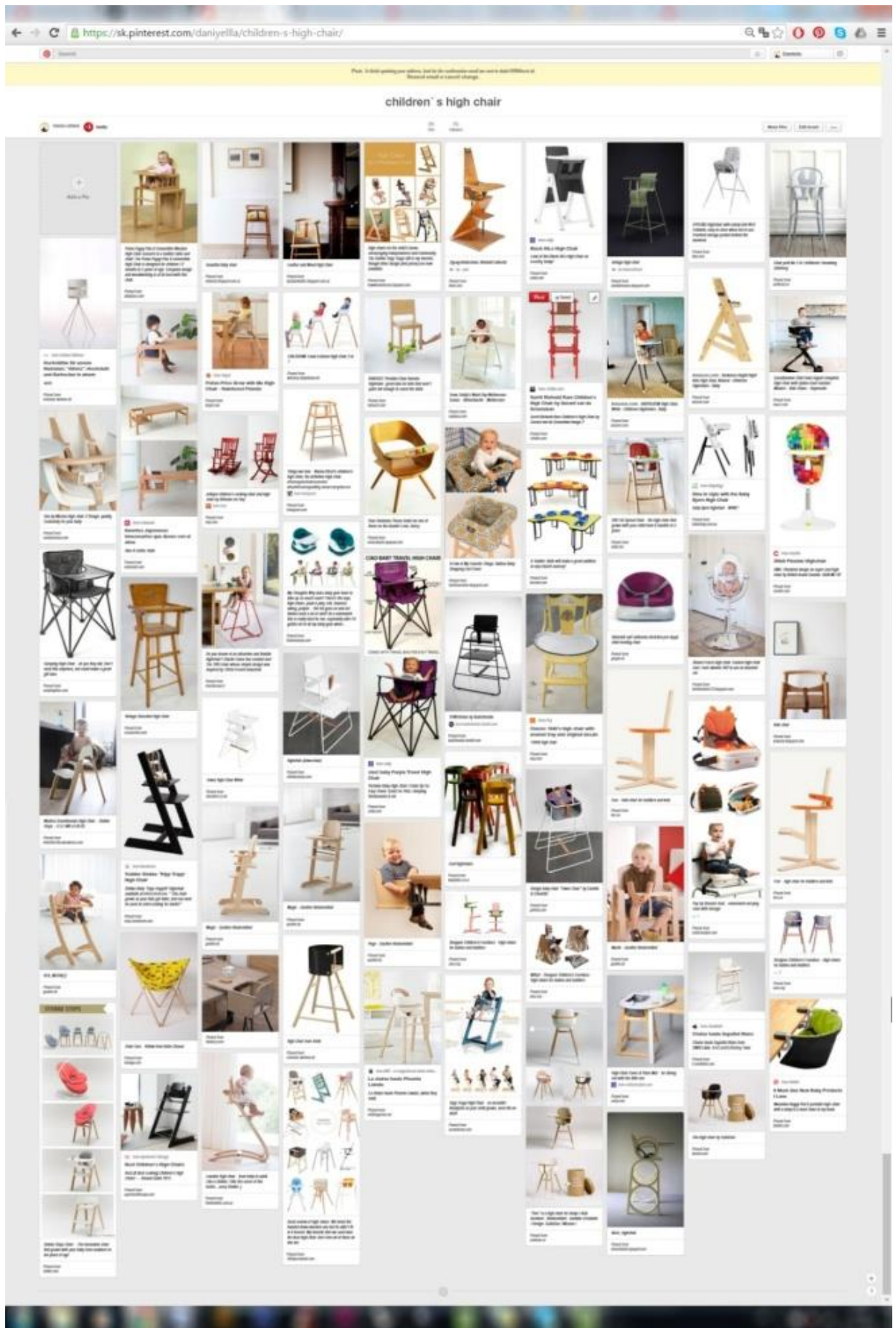


Figure 29. Pinterest has been utilized as a working mood board.

Designers and companies

Each cooperation between designers and companies which have a strong base of finance for researching and developing high-quality products and companies are open to unusual, but great and stunning solutions of the ideas, designers are valued according to their quality, talent and result, is the best example which can be mentioned. Of course, this is an ideal scenario which could be happened. There are several instances of collaborating between ideas and money.

TRIP TRAP by Peter Opsvik



Figure 30. The Stokke Trip Trap chair.

The author of the popular growing chair Stokke Trip Trap is a Norwegian designer Peter Opsvik. It was launched in 1972 which actually this chair is „dancing“ on the edge of the historical overview. It is suitable from toddlers to teenagers and has been already sold in more than 9 million pieces. Made from beech wood, the stability allows a child to climb up the chair securely.

The high chair has a seat and footrest that can be adjusted in depth and height according to requests of a growing child. This timeless design can be used from infancy to adulthood. The wooden construction can hold up to an 85 kg.

The high chair is produced and sold by Stokke Company. The shape of the chair fits right to any dining table and a child can be included.

Of course, the high chair has a lot of accessories which ensure safety sitting in the chair – newborn set, baby set, cushion, tray or harness. [28]

STOKKE STEP SYSTEM by studio PERMAFROST



Figure 31. The Stokke Steps system.

Permafrost is a Norwegian design studio based in Oslo. It consists of four designers - Andreas Murray, Eivind Halseth, Oskar Johansen and Tore Vinje Brustad who graduated

from the Oslo School of Architecture. The result of talented professionals is the Stokke Steps system that is a complete and user-friendly solution.

The Stokke Steps system is a growing chair that is able to use from the birth to ten year age. The basic of this growing system is the ergonomics high chair that is adjustable and also the product system has several accessories which develop requested result. The great design solution allows a possibility of adjusting without any tools and is an extraordinary advantage from user-friendly side. Being a part of family dining is easier now than it ever has been before. [28]

NOMI by Peter Opsvik



Figure 32. The high chair Nomi.

Next design of the growing high chair is one of the last products by Peter Opsvik is called Nomi. It is an adjustable chair launched in 2013 and developed as an adjusted non-tools chair. The concept of the chair is based on a core of variability to fit from the newborns until teenagers.

Several accessories allow the high chair to transform and they make it ready for feeding a toddler or the high chair fits to the dining table. The wooden part of Nomi are made of the beech wood, while the plastic parts are produced of recyclable plastic (polypropylene) free from parabens and phthalates.

The central stem that is the most gripping part of the design ensure the stability. When the height of the seat and footrest is adjusted, the depth is aligned thanks to the shape of the wooden stem. [29]

NUNA



Figure 33. The growing chair ZAAZ by company NUNA.

The portfolio of a Dutch company NUNA is full of the products specialized on the children's equipments. One of them is the high growing chair ZAAZ which has an unusual constructional solution. The hydraulic height adjustment system allows you to customize the chair right to your table. The combination of plastic seat which is made of high quality materials and is bpa and pvc free and aluminium legs. All removable plastic components are allowed to clean in the dishwasher. This chair of the cheerful colours is ageless from 0 until 99. [30]

OVO by studio CuldeSac

Figure 34. The children's high chair designed by Spanish studio CuldeSac.

A group of designers from a Spanish studio CuldeSac decided to focus on creating children design. The Ovo high chair has removable legs, accessories to modify for a growing child. It has a wipe-clean seat, tray and footrest designed for the brand Micuna.

The moulded plastic polyethylene has great resistance and excellent durability suitable for the purpose of the rounded shape chair seat. Design adds an emotional aspect built on the growth. [31]

ONNI by Hannes Puusepänläike

Figure 35. Design of the high chair Luck by Hannes Puusepänläike.

The last example of a high chair is unusual and unexpected design. The technological solution is inspired with Finnish traditions of bending furniture. The beech high chair is created by a Finnish designer Hannes Puusepäniike and it 's produced locally.

A choice of this product is mainly of the solution approach and the Scandinavian influence which cannot be denied. Of course, the cushion seat is necessary for more comfort.

3.2 Analysis of materials

This subhead incorporates the overview of existing high chairs which are available on the current market. The choice is huge, open to plenty of request and possibilities.

Actually, one part of analysis has been focused on different materials of the existing high chairs. Each material solution contains some advantages and disadvantages and basically the comments might be used as a guideline of choosing the right product.

The children's high chairs are divided by materials:

- wood
- plastic
- metal
- paper
- combination of materials

Wood

Some parents prefer traditional but responsible products from non toxic materials which even they used to have in their childhood. Wood is an excellent example of strength and warm material guaranteed sureness and quality. Of course, it is important of a choice-beech, ash, fruit wood, pine or spruce. A great feature of wood is the stability (well –dry), strength and there is not material to fatigue such as for plastics.

advantages

- + quality and strength
- + stableness of the wood weight
- + natural warm and pleasant material
- + growing chairs are usually made of wood

disadvantages

- uncomfortable for a long time if there isn't any fabric seats

- heavier than plastic ones
- less travel-friendly, most of them are not foldable





Figure 36. Examples of the wooden high chairs.

Plastic

advantages

- + plastic is lighter (easy to move)
- + simple to storage which is great for travelling
- + easy to pack up
- + feeding tray is easy to clean (even in the dishwasher)

disadvantages

- plastic is much easier to break
- it is not as durable as wood
- some fabric seat cushion is needed for a higher comfort



Figure 37. Examples of the plastic high chairs .

Metal

advantages

- + construction is strong and stable
- + travel-friendly for
- + easy to clean up a tray and also other parts

disadvantages

- higher weigh
- it can be noisy if a child decides to drum on it
- some fabric seat cushion is needed



Figure 38. Some examples of the metal high chairs.

Paper

An unexpected combination but a light and environment solution of a movable and cheap version of a high chair for feeding on the trip or the cottage.

advantages

- + very light
- + incredibly storable
- + cheap version for travelling
- + environment aspect

disadvantages

- not very stable to leave a child alone
- a high humidity can destroy a cardboard
- not long lasted solution



Figure 39. Solution of the high chair made of cardboard.

Combination of materials

The wide range of the high chairs are produced by the combination of several materials for the best result. Metal or wood construction, or at least legs, plastic base of the seat and textile cushion to make the result product more comfortable. Connecting several material offer more options to designer.

advantages

+ a combination allows a wider choice of options

+ more materials bring a opportunity of variability(shape, movements, adjustment, ...)

disadvantages

– different care about every material



Figure 40. The material combinations on the high chairs.

3.3 Analysis of variability

The author has been searching for the existing products which offer extra functions than others. The high demands force for adding more options to be more successful and competitive on the market.

- **growing chair**

There are a few types of chairs which grow with a child. Some of them have even the capacity till 85 kg; others are designed till teenage age.

- **variable chair – rebuild to a small chair and table**

Older models of the high chair were designed as the multifunctional product to be success on the market. (However it wasn't so common and opened, there wasn't a big choice in past.) In that days parents didn't have a opportunity to make a decision from the hundreds of high chairs.

- **chair to adjust “up and down”**

The decision of buying a high quality high chair is a responsible and demand step.

Customers make a decision on the crucial conditions. One of them is possibility to move with the seat according the situation – sleeping, feeding, playing or just sitting. These high chairs are already suitable for newborns.





Figure 41. The adjustable and growing chair.

3.4 Analysis of space-saving chairs

Some parents think in advance which kind of a chair will buy for a baby. The dimensions of the tiny flats need a smart solution. So in this case, they search for a space-saving piece, but still safety and stable not to be scare to let sitting a baby in the chair.

The folding chairs are also convenient for travelling, spending time in the nature.



Figure 42. Space-saving and in same time folding high chairs.

3.5 Analysis of supplementary equipments to adjust adult chairs

The present market also offers several options to adjust any chair which is at home, in the restaurant or anywhere. If you decide to look for other supplementary equipment instead of the children's high chair, so there are some products which are able to convert for toddler's height.

- **booster seat**
- **harness / safety straps**
- **portable chair booster**

- infant sitting cushion



Figure 43. Available supplementary equipments on the market.

RESEARCH

4 RESEARCH

The academic work supposes to be based on some research done to find out more crucial information to develop the final project. An important step is implemented it in several forms which have to be adapted to specific requests. There is no any guaranteed key how to get the best outcomes. Of course, accessible and useful tools are online questionnaires, blogs or vlogs focused on certain themes, scientific studies, marketing studies or even social media which can be beneficial and quite fast to get some decisive answers which can be used.

An important part of a diploma thesis is a research which I have been implemented in several ways so that it could be used crucial information to create suitable solution of design.

My research part consists of online questionnaire filled the target group ,the survey of the local baby shops, mom 's blogs and social media.

4.1 Online Questionnaire

Online accessible tools of making a research which are offered by several sources. Online questionnaires are suitable to use in case you have more responders and therefore they can save you a plenty of time. Using this kind of digital ways are advantageous to get diagrams or statistics of outcomes to comparison to amount of respondents. Google Forms create and analyze surveys, for free. They are quite easy to use and also available in many languages.

I asked my friends, family and their friend who have some baby or two to answer for my questionnaire. The respondents are young parents in age 20 - 40 years. The aim of questionnaires was to find out an influence of choosing children's high chair. The form is divided into four parts and its length takes approximately 3 - 4 minutes to fill in. Each section is focused on the certain topic of a searching answer. The questionnaire has fifteen questions.

I picked up the most interesting questions for my research to find out more information. It was been filled with 42 respondents – 38 women and 4 men, all of them are parents or are expecting a baby. The age of the babies was between 0 – 5 years.

The second part was focused on the furniture information. More than 90% of the respondents have the high chairs and the rest of them are planning to buy in the future. My survey shows that plastic and wooden high chairs are the most favourite materials.

What kind of chair do you prefer? (42 responses)

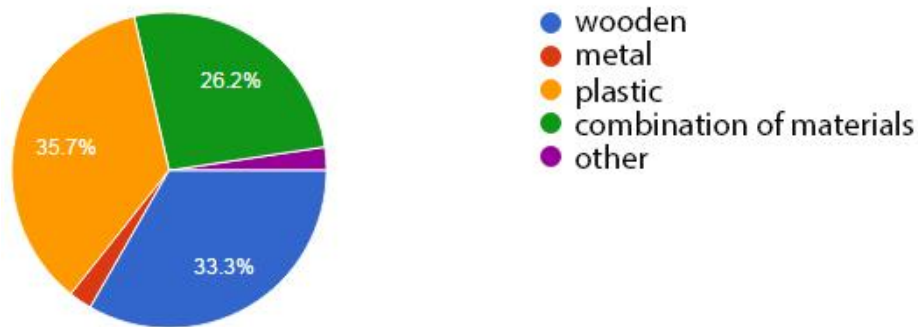


Diagram 1.

I have asked them how they chose their high chair and what kind of touchstones they had. The top of the priorities was hygiene, quality and prize.

The question asked about positive and negative things. The respondents made a complaint most about a missing tray or wrong height to compare the seat, a missing harness or that straps are not possible to remove for washing. The disadvantage was mention that the high chair is not possible to adjust or recline.

The advantages of the high chairs are easy to clean, a light weight, a growing chair, flexible, space-saving, stable, a moveable tray, comfortable or rubber upholstery.

What did you influence to choose your high chair? (42 responses)

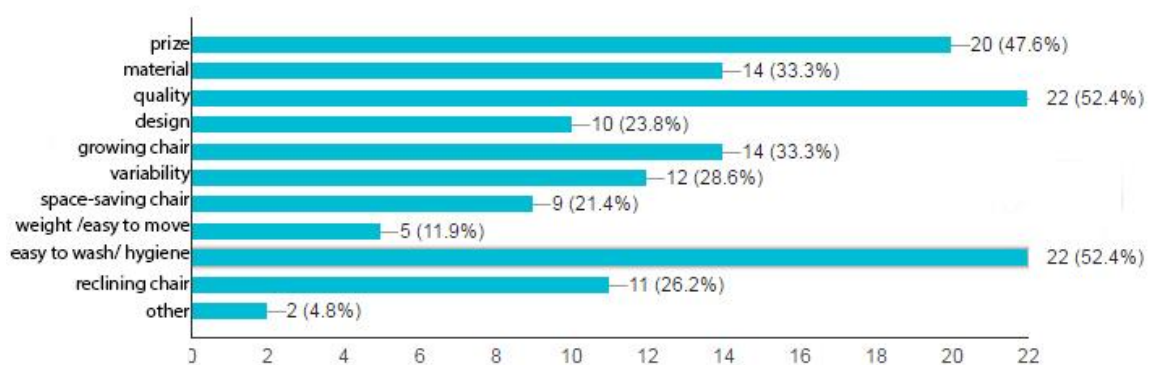


Diagram 2.

I have created the complex form; I needed to know their professions and the economical situation to be aware of the result from the questionnaire. Almost 60% of the respondents own new high chairs, 28% second-hand chairs and 12% borrow chairs. I have asked if their choice of high chair had influenced by finance. The respondents answered equally yes and no - 42,9 % : 42,9% .

What your choice of high chair influenced by finance? (42 responses)

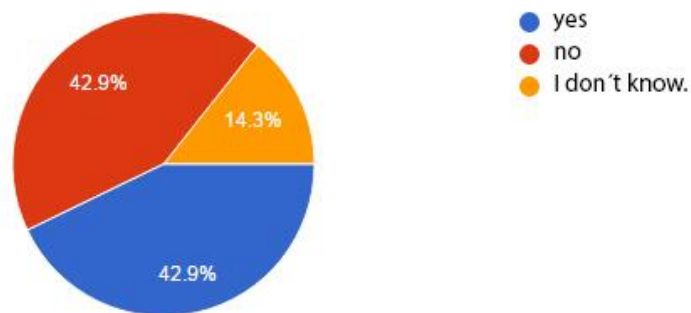


Diagram 3.

I have been wondering if parents have focused on the integration during eating. Almost 70 % of answers were positive about sitting and eating with their child together. More than 80% children sit in the chair during feeding. All of them answered for 100% that it has/ had a positive impact when their child becomes a part of „table“.

Does /did your child sit in the high chair? (42 responses)

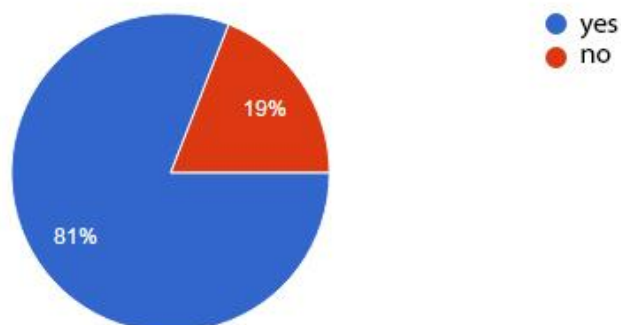


Diagram 4.

Does your child sit with you during breakfast/luch or dinner? (42 responses)



Diagram 5.

4.2 Demand in the local shops

The preferences of buying children's high chairs in the local shops

One of the research steps was found out more useful in the local specialized shops. I have visited three of them to talk with the shop assistants and gained the gens on the demand of the high chairs. The questions were focused on the design, prize and functionality of the selling products, a choice or the best-selling type of high chair.

- **Shop “Kočárky Zlín”**

<http://www.kocarky-zlin.cz/>

“There are two types of people who usually come to buy a children's high chair. One of them who care about the prize and they are ready to pay maximum till 80 €. And there are others who drive expensive cars and they search a design one of certain colour combination which should fit in the luxury flat. Of course, they don't care about money. The functionality is not crucial at all.

The most bought children's high chairs are plastic; the wooden ones are not popular so much. The important part of a choice is the adjustability and possibility to fold it and even to hide next to the wardrobe.

In my opinion, the best high chair is Per Perego chair designed by Italian company. It is an ideal in any case, only one disadvantage is a prize, it costs almost 200 € for it. The adjustability (a baby can fall asleep after eating), the stability which is unique in this high chair which means it is really safety, especially when your child moves a lot. Another big advantage is space-saving folding function. Easy folding and unfolding is handy for traveling.

In general, all children's high chair constructions which allow you to fold and storage, are highly asked and bought.”

“What about the growing chairs? Are they selling?”

“The growing high chairs are not sold so much despite the fact we offer several models....”

- **Pompo Shopping Centre Čepkov**

<http://www.pompo.cz/>

“The customers visit us with a certain notion, because they know our products which we

sell here. If I should sum up the three points of choosing, so there are 1.PRIZE (the most important one), 2.DESIGN and the last one is 3.FUNCTION.”

“Really? Function is on the third place? Don’t they care?”

“Actually it isn’t decisive as it should appreciate.”

“We are offering these plastic high chairs with metal legs and textile or rubber cushion seats and components. The prize starts from 55 €.”

“And what about some boosters or safety seat belts? Do you sell them?”

“Yes, we do, but they are not sold so much. Let’s say from a hundred customers, just two of them want to buy it and they are decided to buy them before coming in the shop.”

- **Kočárky V&V - shop**

<http://www.kocarkyvav.cz/>

“What is a crucial impact of choosing children’s high chair? Can you tell me three points of choosing the right chair?”

“I can’t. It’s not possible. Each customer is individual. The age of a child is really important when customers want to buy a children’s high chair. Some parents decide to use a chair from the birth, others starts using it when a infant is 6 months old. In the shop we offer plastic and wooden chairs, the plastic ones costs from 65 € and they are quite popular because of easy cleaning, they are easy to set up the heights by requests.

The wooden high chairs are wanted of their possibility of assembling to a small table and chair. The safety belts are missing, so there are suitable for bigger babies who can already sit themselves.”

This small market survey was performed with the conversations of the present shop assistants and it might have seemed that the result is not relevant. However, the gained feedback found out surprised answers. I have considered the form of research for the benefit and handy in designing.

4.3 Social Media

Blogging has become a popular hobby for last few years. Let’s say it happened a sight of our generation. Everybody wants to write, give advice and make videos to gain as many followers as it’s possible.

Popular and friendly-user blogs which are often written by parents (mostly by mothers). Of course, many mothers want to share their experience, troubles and delights, as well. Moms and their kids are not any exceptions. Mommy bloggers.

Women, including mothers, have been among the most active demographic groups on social media for some time.

People need to be social active and the huge amount of blogs and profiles have just confirmed the popularity statement of the social medias.

The diploma thesis is a medium of searching answers for the unknown questions. Sharing information through the people with different tools is a way of understanding challenges and searching the certain solutions. The research which has been an inseparable crucial element and the base of subsequent steps.

The answers of parents who are the main customers and their children as a target group have been the impulse to think more about each detail and consider of functionality. Each smaller or bigger complaint which was written in the questionnaire was as a piece of puzzle.

PROJECT

5 WORKING PROCESS

Creative thinking is embodied in the whole process included either brain storming or mind mapping. Working development and crystallizing the right direction of a certain product is done in the several steps. My favourite and proved way of collecting and connecting thoughts is a mood board. This simple but effective tool is possible done in a physical or digital form as the collage of images or illustrations, typography or texts, objects or colours in the various compositions.

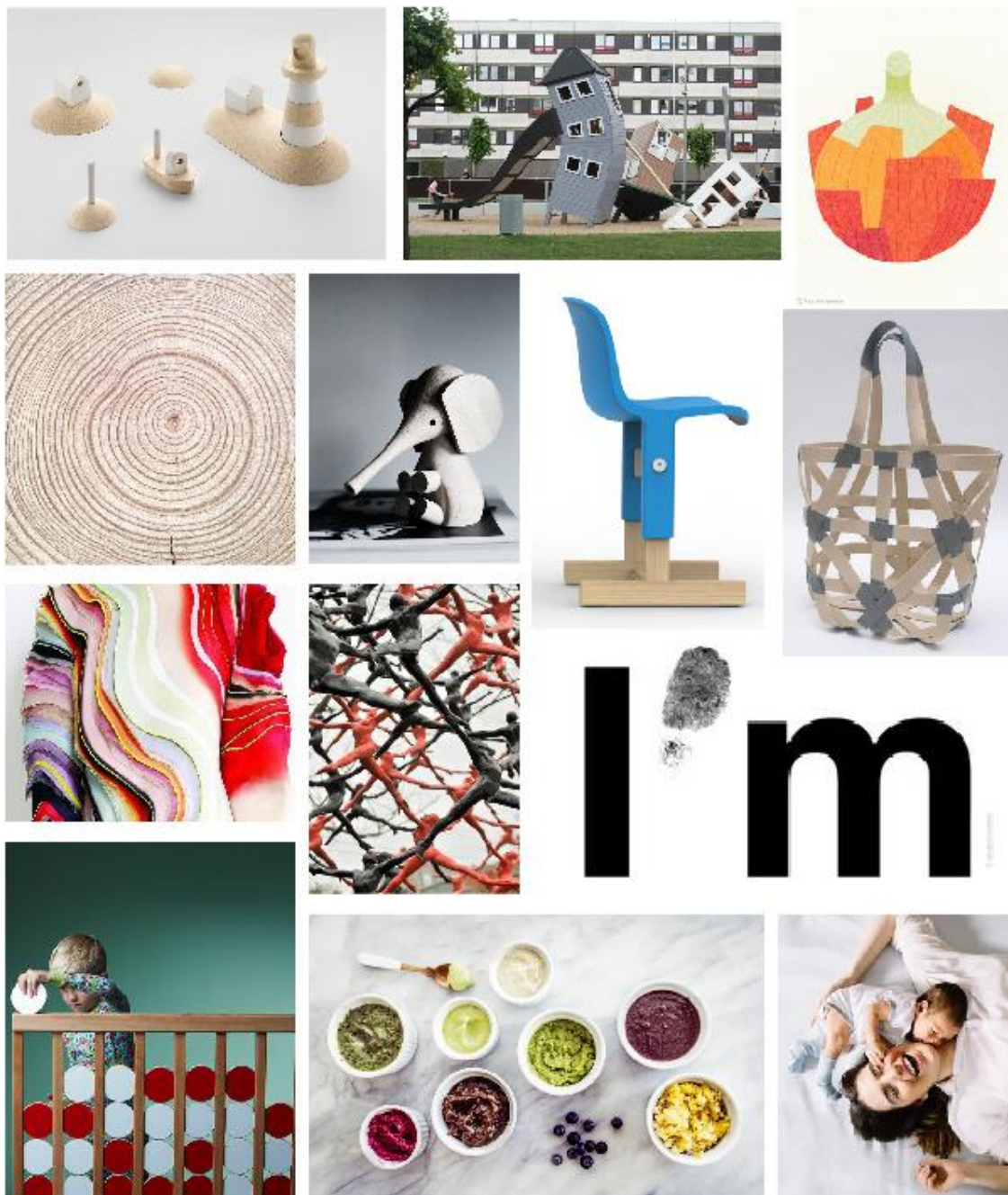


Figure 44. My mood board of inspiration sources.

A mind map is a diagram of information. The principle is united all fragments which have the place in a project because they might not be directly visible. This is a highly effective way of collecting thoughts out of the brain to take notes and visualize them.

The centre of my mind map was placed “children design” as a medium of all roots. Taking out all potential options I have made a final decision of the product theme. My aim was concentrated for product(s) which could be a challenge of leaning.

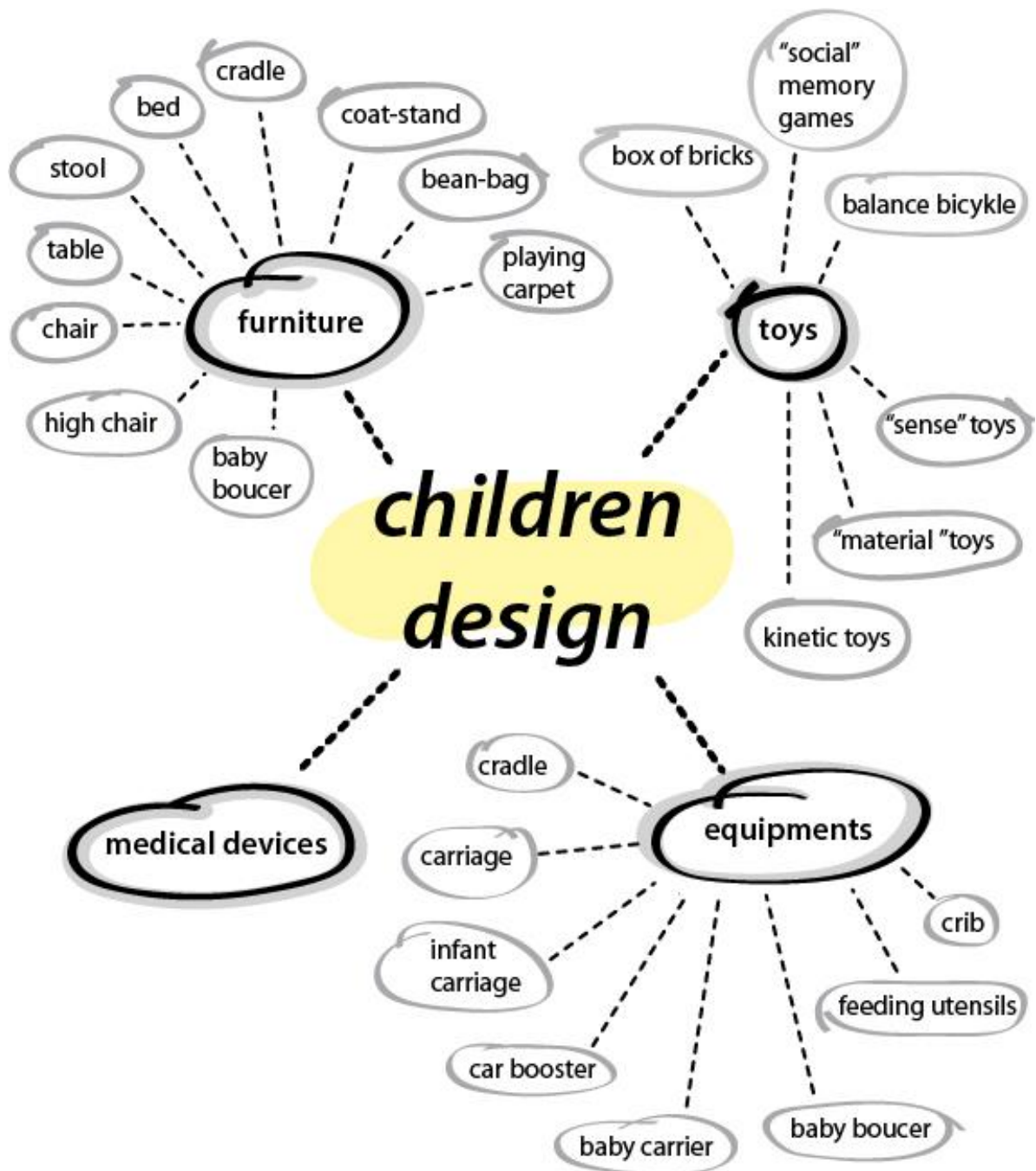


Figure 45. The first mind map of the creative process.

So I have done another mind map which consists of all elements which I have had to deal with. Avoiding coming to a deadlock, I have determined the basic points to develop the concept. The aspects of the high chair

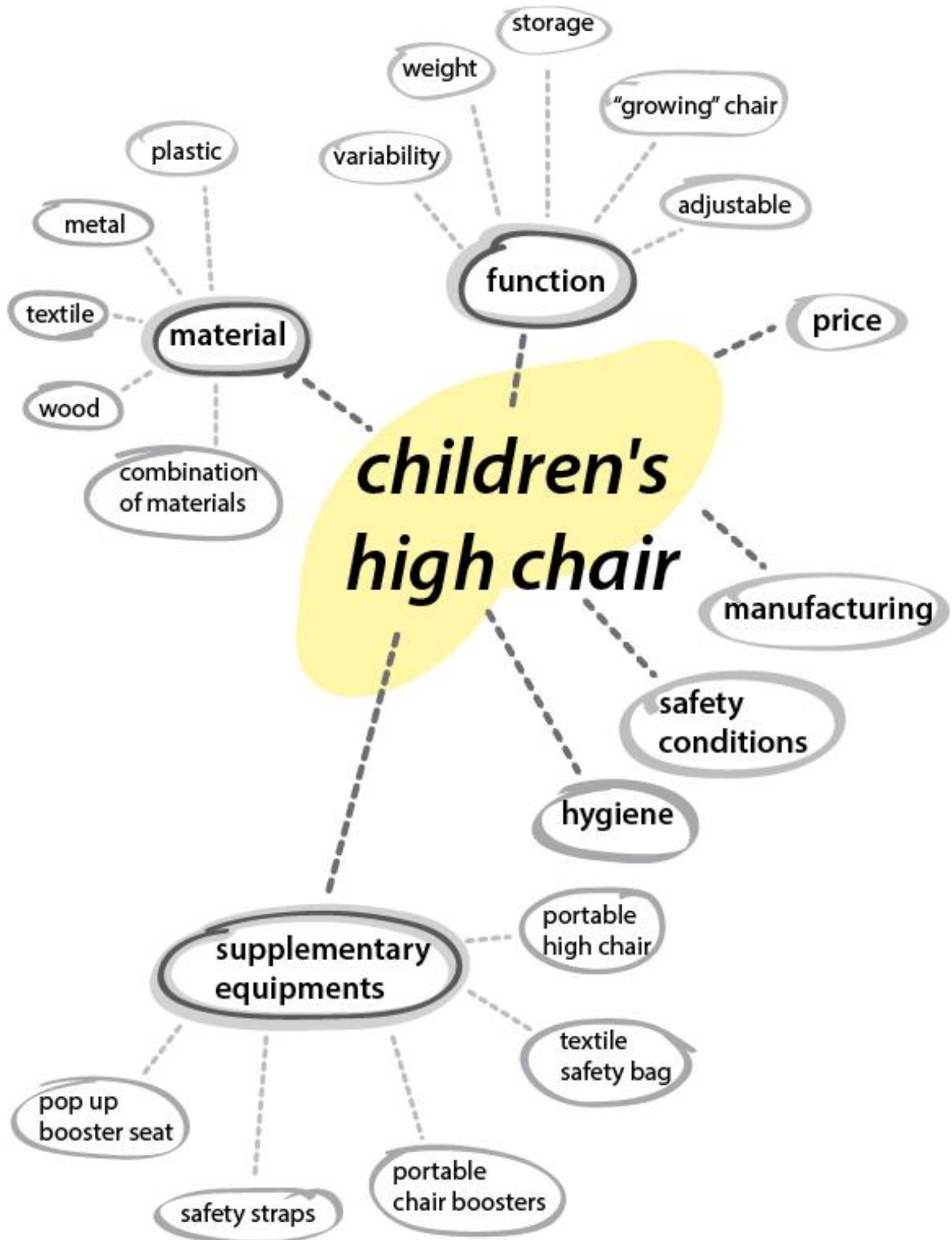


Figure 46. The second mind map of the creative process.

5.1 First ideas and sketches

The inspiration sources were gained from nature- the ideas were influenced with peacock, flower and branches of trees. The content of the ideas was heading to the connection of something soft and fluffy - textile segments of colourful combinations. I had a clear idea of the material combination - wood and textile for the cushion.

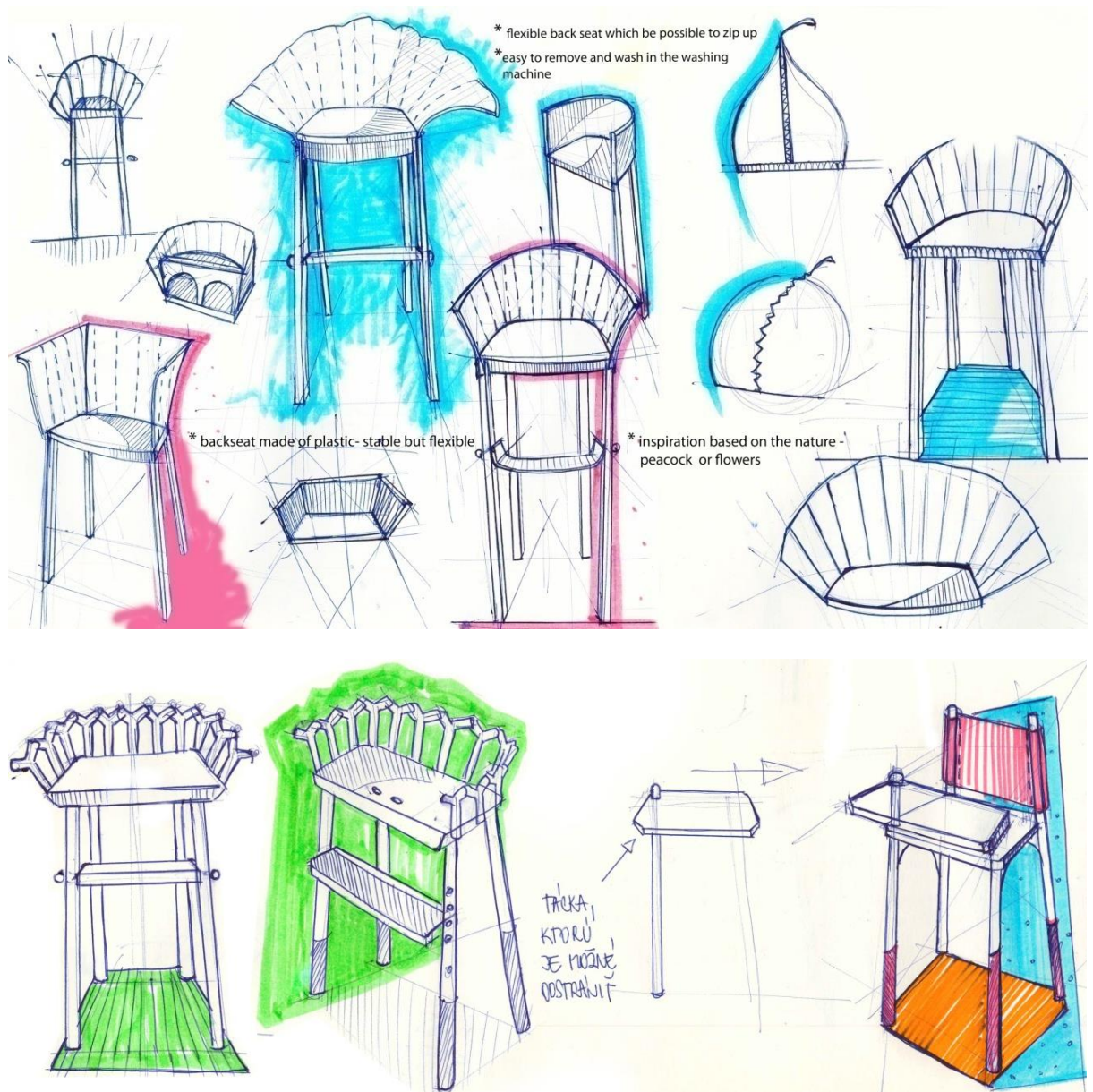


Figure 47. The first sketches of different ideas.

5.2 Developing ideas

I have come out with some idea and sketches, but I made a search with different ways. The market survey offers the high chairs for baby feeding in the age 0 months to 3 years, with the variants of the growing chairs or the supplementary equipments that are used to adjust the height for a toddler. I have been searching the suitable material solution

The initial ideas and sketches were certainly appropriate solutions were based on several mood boards and mind maps as a guide for a list of options that offers the chosen topic.

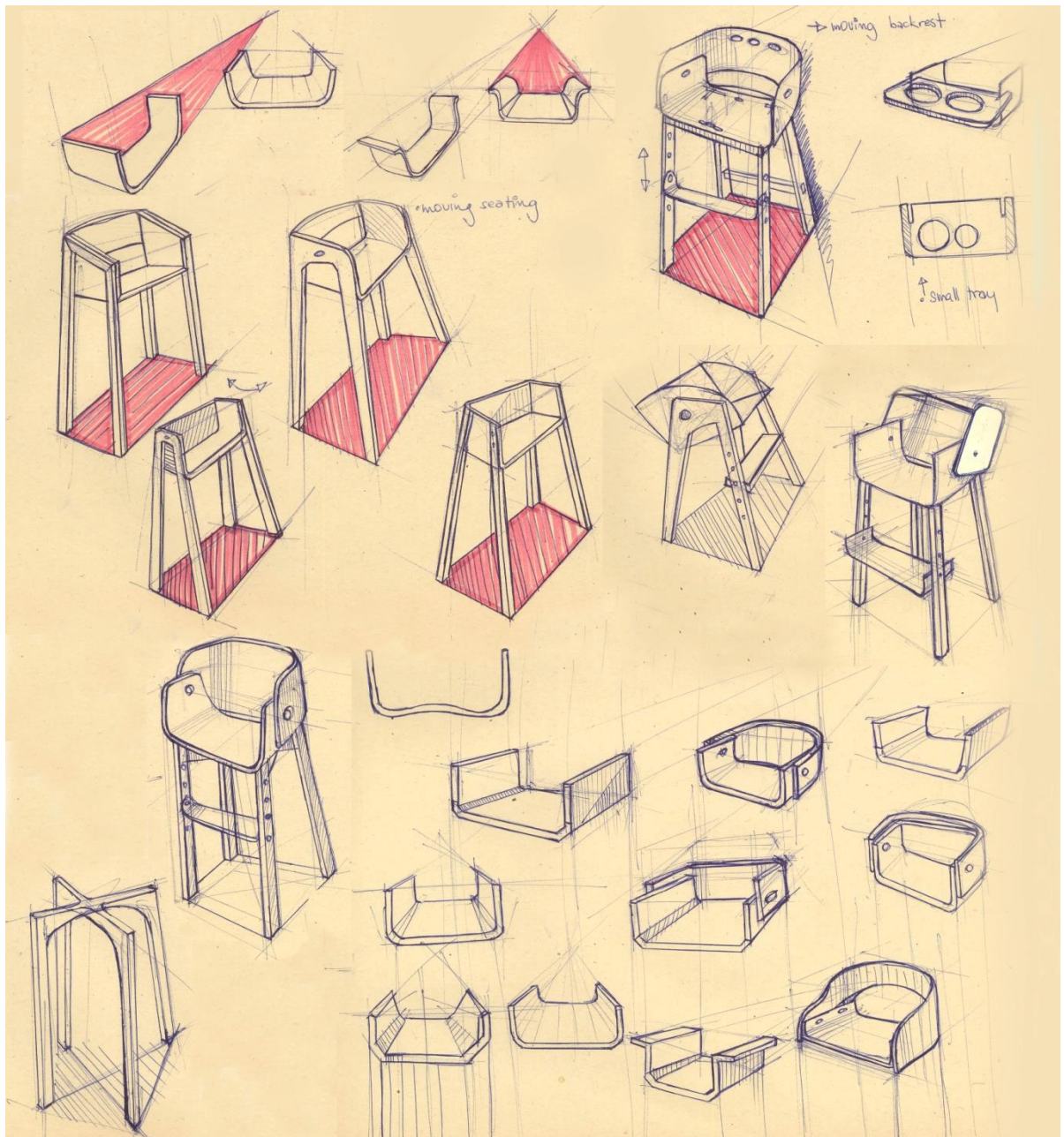


Figure 48. More sketches and ideas.

5.3 Visualizations of design ideas

I have developed more ideas and I have searched for better solutions. The important aspect is a technological process which influences design of a product

I have been looking for a solution of the adjustable back seat and some simple but strong detail which could give an attractive feature.

There are some options of my first ideas which consist of a moveable backseat and foot-rest. There were a lot of details which were needed to solve.



Figure 49. Several visualization options of the developing ideas.



Figure 50. Visualization of a moveable back seat draft.

5.4 Final design of high chair Emma

The final design solution of the children 's high chair is based on the several contributions.

Each product needs to have some an identity of itself. The name is a part of the creative process. I have decided to name **the high chair Emma** which means cheerful and loved from a German word. These adjectives describe the high chair and the features which should evoke when you see it.

I have selected wood as the principal material for many positive features. The developing process has led to the technique of wood bending which has a long tradition the Czech Republic. The essential benefit of my high chair solution is the economical and technological approach. The same bending segment which is used for seat back, seat and footrest is just adjusted by cutting for the requested parameters. This design approach is crucial for a smart production.

The adjustable back seat and footrest is easy to move for needs of a growing child and it guarantees the comfortable sitting during feeding or playing in the high chair.

My target group of the children's age is between 6 months and 3 years to specify the dimensions of the high chair.

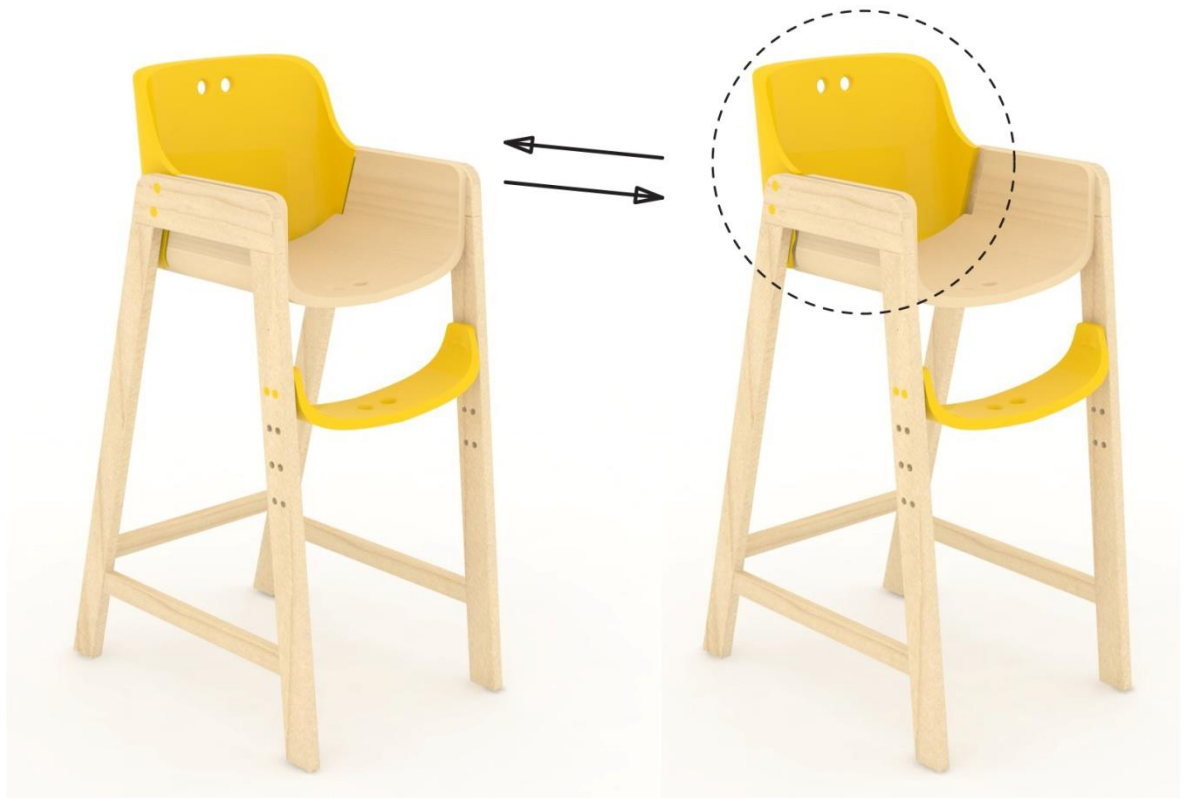


Figure 52. The adjustable seat back of the high chair.



Figure 53. The adjustable footrest of the high chair.

The high chair Emma is possible to have in several colour. Wood is possible to stain or lacquer in many colours but they must be non toxic for children furniture. The colour range is unlimited, but the main colour is shiny and joyful yellow as dandelions, fluffy chicks or sun.



Figure 54. The colourful variations of the final design solution.

There is a ground plan of the high chair Emma – all views.



Figure 55. A top view, a side view, a front view and three-quarter view.

Wood is a warm and pleasant material, but it can be a bit uncomfortable for long sitting. One of the solution is a seat cushion for more comfortable sitting. The ideal material of the seat cushion is easy washable – rubber finishing textile or waterproof textile. On the market there are usually available cotton seat cushions which are needed to wash more often (at least once a week). The pattern of the textile should be playful and nicely colourful to for child developing. There are some simple design ideas of the textile patterns.



Figure 56 .The patterns of the seat cushions.



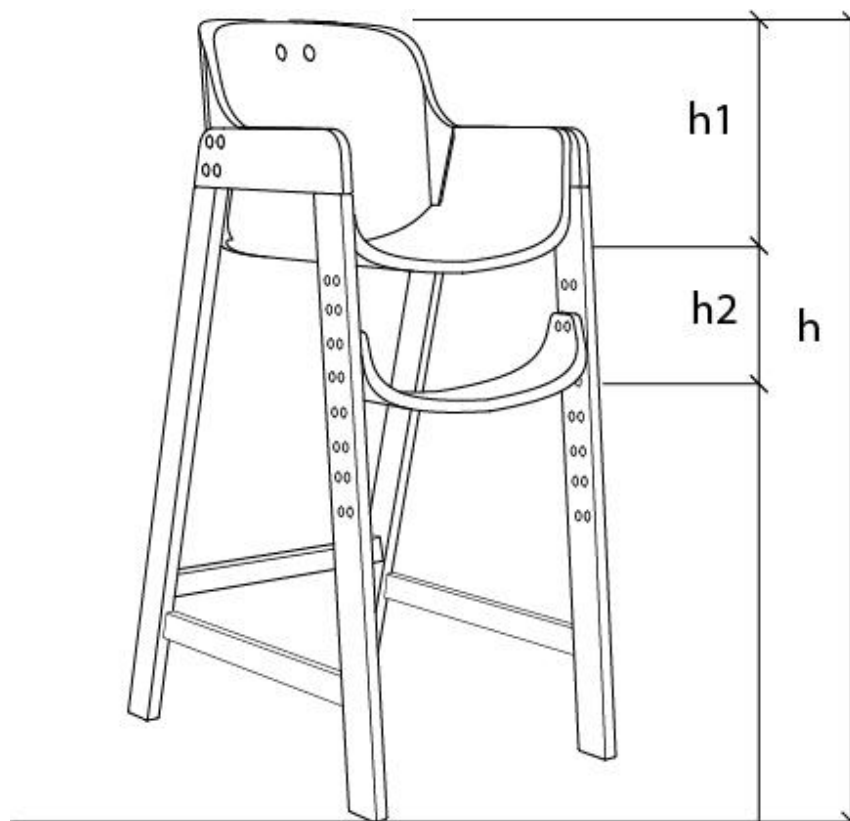
Figure 57. The patterns of the seat cushions.

Of course, the safety conditions are really important. The harness or safety straps are needed for each high chair. They keep balance and hold a child in the seat of the high chair. The important detail is easy to move and wash which I have found out in my research. The parents made a complaint in case the straps weren't possible to wash or it was too complicated to move them away.

The last really important part of the high chair is the dining tray. The tray has to be really stable and firm. On the other hand, it has to be easy to remove by adults, but a child can't remove it himself/ herself. The design of the tray is substantial for the safety conditions.

5.5 Ergonomic studies

A part of design solution is also the ergonomic study. Initially it's based on the derived parameters of publications and measurements. Another clue point was a comparison of existing products and their dimensions, adapting the material used, shape and age of a child, whom I have created dimensional parameters for design.



a height of a child		900 mm	1100 mm	1350 mm
	H ¹	540	510	480
	H ²	180	210	240
	H ³	220	270	335

Table 1. The table of the seating parameters.

Important conditions of the design outcome:

- stable design of interesting details
- easy to clean and manipulate
- removable tray but not moved by a child
- the safety harness or straps

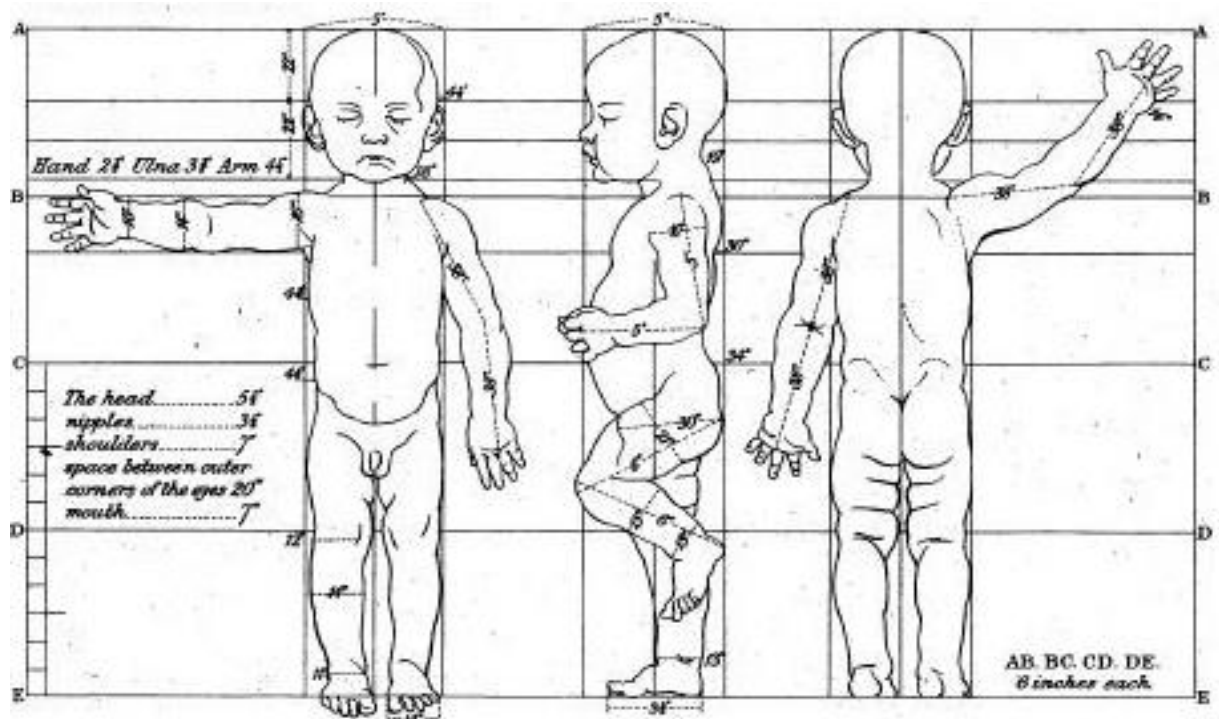


Figure 58. The drawing of the infant parameters- 6months.

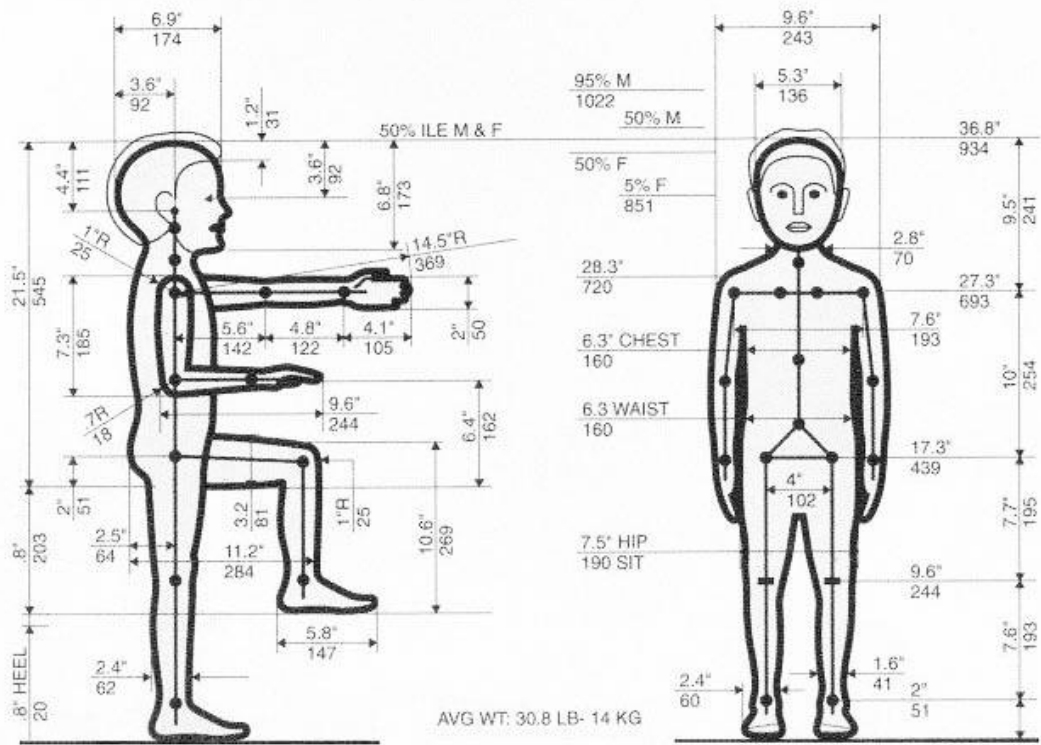


Figure 59. The dimensions of 2,5-3 years old child.

In the picture there are two examples of children. On the left the small boy is 1 years old and other boy is turning to 3 years old. The different height is clear, the footrest and back seat is possible to adjust according to the requests.



Figure 59. The high chair's dimensions according to the children.

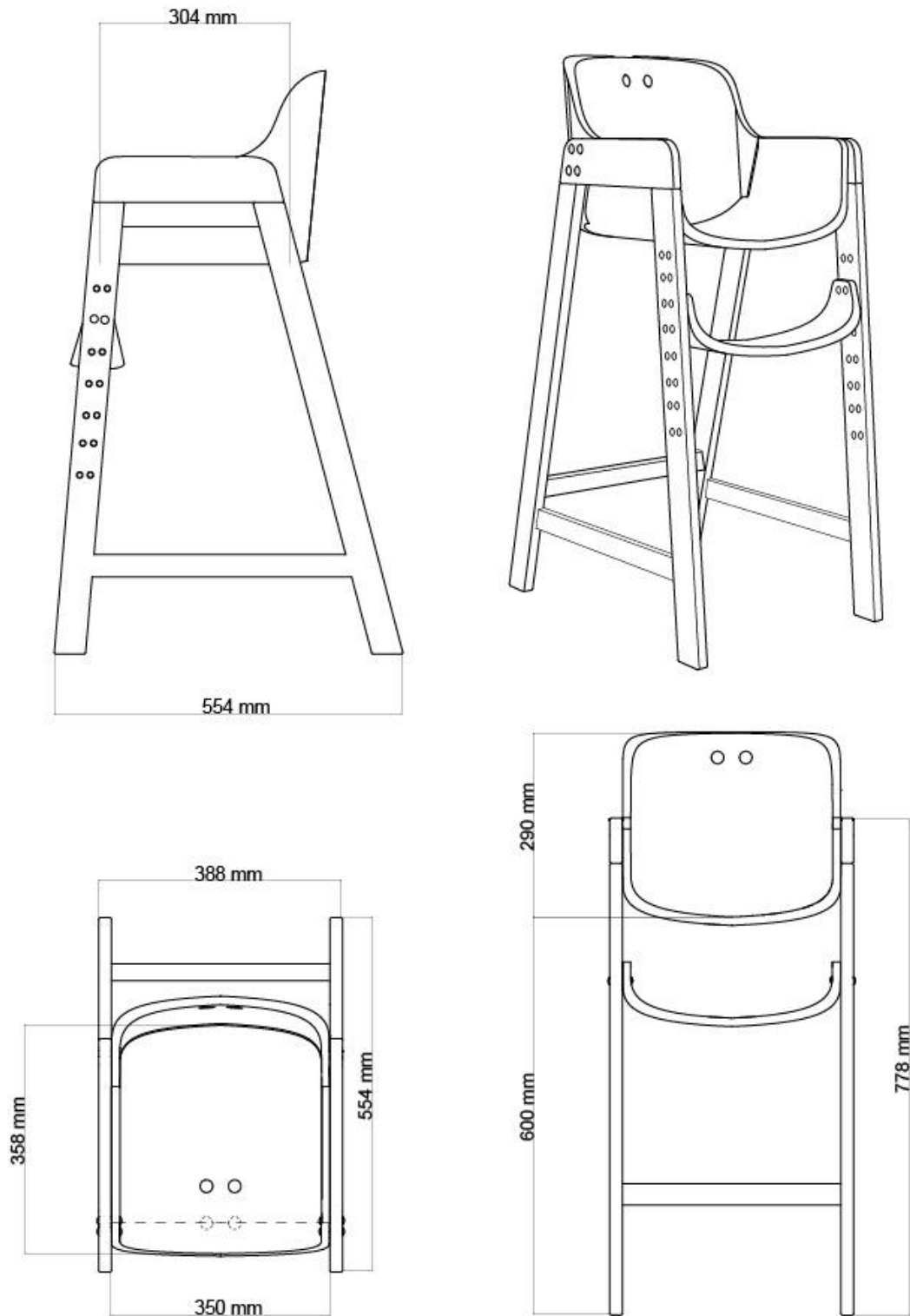


Figure 60. The technical drawing of the final design.

CONCLUSION

My diploma thesis has been dealing with the challenge of the children high chair. The work has been consisted of the several parts based on the historical information, different approaches of searching and developing, analyzing from several different points.

The final result is a design of children´s high chair. The main contribution is technological, design, material and aesthetical approach.

My high chair Emma is a unique from the several points. The construction of the chair is made from the bent segments which are adjusted for the certain parts – a seat, a back seat and adjustable footstool. The wooden bended parts are made from veneers in the same mould which is advantageous from the manufacturing and economical aspect.

The adjustable back seat and footrest are able to adapt for the height of a growing children.

The benefit in terms of design is aesthetics and playful design. The simple element of the two holes that appears on the back seat, seat and footrest in addition to functional (hole will be used for passing through the baby harness), but also expressive meaning. The detail of the holes adds emotional accent.

The high chair Emma is a piece of cheerful and beneficial piece of furniture.

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LIST OF ABBREVIATIONS

BPA bisphenol A

cm centimetre

mm millimetre

etc. et cetera

pvc polyvinyl chloride

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APPENDICES

APPENDIX PI: QUESTIONNAIRE

APPENDIX PII: CD

APPENDIX P I: APPENDIX TITLE

Children's high chair

My diploma thesis is focuses on searching a high-quality solution of children's high chair. Children design is a specific issue which could have had an influence on child developing. Therefore I am looking for some answers from the experts - moms and dads who have to test functionality and quality of products every day.

1. Sex

Tick all that apply.

male

female

2. Do you have any children?

Mark only one oval.

0, but I am expecting a baby...

1

2

3

3 and more

3. How old is your baby?

Mark only one oval.

0 - 6 months

6 - 12 months

12 - 18 months

18 - 24 months

18 - 36 months

36 months and more

How is your chair?

4. Do you have a children's high chair?

Mark only one oval.

yes

no, but I am planning to buy soon.

no, I use other way of feeding .

Other:

5. What kind of chair do you prefer?

Mark only one oval.

- wood
- metal
- plastic
- combination of materials

6. Please write down a type and brand of your high chair.

.....

choice and touchstone

How did you make a decision of buying a high chair? What touchstones did you influence?

7. What did you influence to choose your high chair?

Mark only one oval.

- prize
- material
- quality
- design
- "growing chair"
- variability
- compactness /easy to storage/
- weight /easy to move/
- easy to wash /hygiene/

8. What is the disadvantage of your chair?

.....

9. What is the advantage of your chair?

.....

economics

A choice of products is depended on finance in many times.

10. What is your job?

.....

11. **What your choice of high chair influenced by finance?**

Mark only one oval.

- yes
- no
- I don't know.
- Other:

12. **Is / was your chair...**

Mark only one oval.

- new
- borrowed
- second-hand

development and integration

Mental development of the child is influenced by many factors...

13. **Does /did your child sit in the high chair?**

Mark only one oval.

- yes
- no

14. **Does your child sit with you during breakfast/luch or dinner?**

Mark only one oval.

- yes
- no
- sometimes, it depends on his/ her mood.

15. **Do you think his/ her intergation has/ had a positive impact?**

Mark only one oval.

- yes
- no

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